

SUPPLEMENT.

The Mining Journal, RAILWAY AND COMMERCIAL GAZETTE.

FORMING A COMPLETE RECORD OF THE PROCEEDINGS OF ALL PUBLIC COMPANIES.

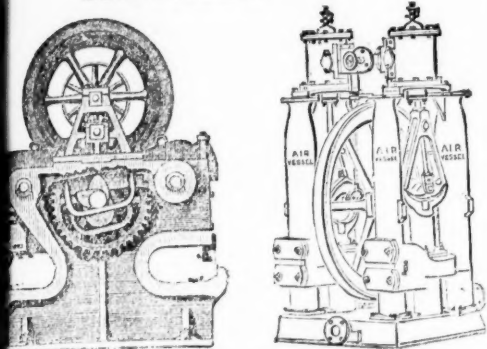
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2128.—VOL. XLVI

LONDON, SATURDAY, JUNE 3, 1876.

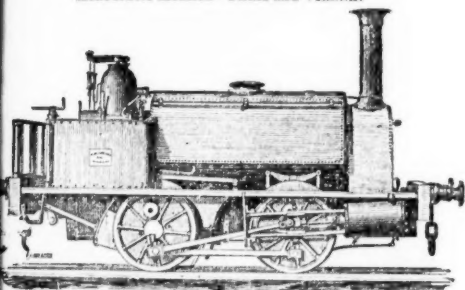
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PUMPING ENGINES; WINDING ENGINES; STAMPING ENGINES;
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PATENTEES.



PATENTEES.

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200 TONS OF BOLTS, NUTS, &c., ALWAYS IN STOCK,
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Will make 10 bolts per minute. Will make 60 nuts per minute.

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60 of these Bolt and Spike-making Machines have been sold to Engineers,
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These Nut-making Machines will produce 66 to 85 nuts per minute, 1/4 to 5/8 in.
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Machines to make up to 1 1/2 in. nuts are in progress of making.
See the Machines working, apply as above.



PARIS, 1875.
BRONZE MEDAL, 1875.



ORDER OF THE CROWN OF PRUSSIA.



FALMOUTH, 1867.
SILVER MEDAL, 1867.

A DIPLOMA—HIGHEST OF ALL AWARDS—given by the
Geographical Congress, Paris, 1875—M. Favre, Contractor, having
exhibited the McKean Drill alone as the MODEL BORING MACHINE
for the ST. GOTHARD TUNNEL.

SILVER MEDAL of the Highland and West of Scotland
Agricultural Society, 1875—HIGHEST AWARD.

At the south end of the St. Gothard Tunnel, where

THE MCKEAN ROCK DRILLS

Are exclusively used, the advance made during eight consecu-
tive weeks, ending February 7, was 24'90, 27'60, 24'80, 26'10,
28'30, 27'10, 28'40, 28'70 metres. Total advance of south head-
ing during January was 121'30 metres, or 133 yards.

In a series of comparative trials made at the St. Gothard Tun-
nel, the McKean Rock Drill continued to work until the pres-
sure was reduced to one-half atmosphere (7 1/2 lbs.), showing
almost the entire motive force to be available for the blow
against the rock—a result of itself indicating many advantages.

The GREAT WESTERN RAILWAY has adopted these
Machines for the SEVERN TUNNEL; the LONDON AND
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Works. A considerable number of Mining Companies are now
using them. Shafts and Galleries are driven at from three to
six times the speed of hand labour, according to the size and
number of machines employed, and with important saving in
cost. The ratio of advantage over hand labour is greatest
where the rock is hardest.

These Machines possess many advantages, which give them
a value unapproached by any other system of Boring Machine.

THE MCKEAN ROCK DRILL IS ATTAINING GENERAL
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The MCKEAN ROCK DRILLS are the most powerful—the
most portable—the most durable—the most compact—of the
best mechanical device. They contain the fewest parts—have
no weak parts—act without SHOCK upon any of the operat-
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Drill—may be worked at a higher pressure than any other
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the smallest, shortest, and lightest of all machines—will give
the longest feed without change of tool—work with long or
short stroke at pleasure of operator.

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grit and accidents. The various methods of mounting them
are the most efficient.

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character of work in hand in writing us for information,
on receipt of which a special definite answer, with
reference to our full illustrated catalogue, will be sent.

PORTABLE BOILERS, AIR COMPRESSORS, BORING STEEL,
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The McKean Drill may be seen in operation daily in London.

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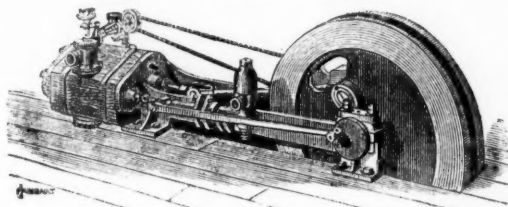
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variable expansion gear. Will work as economically as most con-
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Compound Condensing Engines, for Mills, Pumping,
Blowing, &c.

Patent Feed Heaters, guaranteed to heat the feed water up
to over 200° Fahr., and save about 15 per cent. of fuel.

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and accessible.

Cornish, Multitubular, and other Boilers.

CATALOGUES & ESTIMATES ON APPLICATION.

THE
PATENT SELF-ACTING MINERAL
DRESSING MACHINE COMPANY
(LIMITED).

T. CURRIE GREGORY, C.E., F.G.S.

OFFICES,—150, ST. VINCENT STREET, GLASGOW.

IMPORTANT NOTICE TO MINE PROPRIETORS.

MR. GEORGE GREEN, ENGINEER, ABERYSTWITH,
SUPPLIES MACHINES under the above Company's Patents for
DRESSING all METALLIC ORES. Dressing-floors having these Machines pos-
sess the following advantages:—

- 1.—THEY ARE CHEAPER THAN ANY OTHER KIND IN FIRST OUTLAY.
- 2.—ONLY ABOUT ONE-FOURTH OF THE SPACE USUALLY OCCUPIED
BY DRESSING-FLOORS IS REQUIRED.
- 3.—FROM 60 TO 70 PER CENT. OF THE LABOUR IN DRESSING, AND
FROM 5 TO 10 PER CENT. OF ORE OTHERWISE LOST, IS SAVED.
- 4.—THEY ARE THE ONLY MACHINES THAT MAKE THE ORE CLEAN
FOR MARKET AT ONE OPERATION.

They have been supplied to some of the principal mines in the United Kingdom
and abroad—viz.,

The Greenside Mines, Patterdale, Cumberland; London Lead Company's Mines,
Darlington, Colberry, Nanthead, and Bollyhope; the Stonecroft and Greyside
Mines, Hexham, Northumberland; Wanlockhead Mines, Abington, Scotland (the
Duke of Buccleuch's); Bewick Partners, Haydon Bridge; the Old Darren, Esgair-
mwyn, and Ystumtuen Mines, in Cardiganshire; Mr. Beaumont's W.B. Mines,
Darlington; also Mr. Sewell, for Argentiferous Copper Mines, Peru; the Brats
berg Copper Mines, Norway, and Mines in Italy, Germany, United States of
America, and Australia, from all of whom certificates of the complete efficiency of
the system can be had.

WASTE HEAPS, consisting of refuse chats and skimpings of a
former washing, containing a mixture of lead, blende, and sulphur,
DRESSED TO A PROFIT.

Mr. BAINBRIDGE, C.E., of the London Company's Mines, Middleton-
in-Teesdale, by Darlington, writing on the 20th March, 1876, says—"The yearly
profit on our Nanthead waste heaps amounted last year to £600, besides the ma-
chinery being occupied for some months in dressing ore-stuff from the mines. Of
course, if it had been wholly engaged in dressing wastes our returns would have
been greater; but it is giving us every satisfaction, and bringing the waste heaps
into profitable use, which would otherwise remain dormant."

Mr. T. B. STEWART, Manager of the Duke of Buccleuch's Mines,
Wanlockhead, Abington, N.B., writing on 20th March, 1876, says—"I have much
pleasure in stating that a full and superior set of your Ore Dressing Machinery has
been at work at these mines for fully a month, and each day as the moving parts
become smoother, and those in charge understand the working of the machinery
better, it gives increasing satisfaction, the ore being dressed more quickly, cheaply,
and satisfactorily than by any other method."

Mr. BAINBRIDGE, speaking of machinery supplied Colberry Mines,
says—"Your machinery saves fully one-half on old wages, and vastly more on the
wages we have now to pay. Over and above the saving in cost is the saving in ore,
which is not much short of 10 per cent."

GREENSIDE MINE COMPANY, Patterdale, near Penrith, say—"The
separation which they make is complete."

Mr. MONTAGUE BEALE says—"It will separate ore, however close
the mechanical mixture, in such a way as no other machines can do."

Mr. C. DODSWORTH says—"It is the very best for the purpose,
and will do for any kind of metallic ores—the very thing so long needed for dress-
ing-floors."

Drawings, specifications, and estimates will be forwarded on application to—
GEORGE GREEN, M.E., ABERYSTWITH, SOUTH WALES.

SELECTED BY THE ADMIRALTY FOR THEIR WORKS.



T. A. WARRINGTON,
CO-PATENTEE OF "THE POWER-JUMPER," SOLE AND EXCLUSIVE AGENT FOR

THE "KAINOTOMON" ROCK DRILL,

THE CHEAPEST AND BEST MACHINE FOR SINKING, MINING, AND QUARRYING.

"THE ECONOMIC" COAL CUTTER,

FOR SIMPLICITY, ECONOMY, AND EFFICIENCY UNEQUALLED.

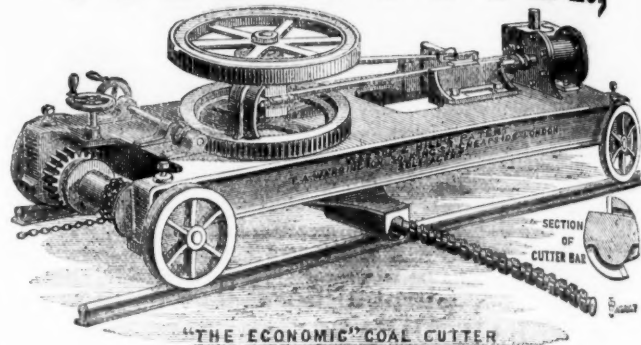
AND SUPERIOR

AIR COMPRESSORS;

ENGINEER AND CONTRACTOR FOR

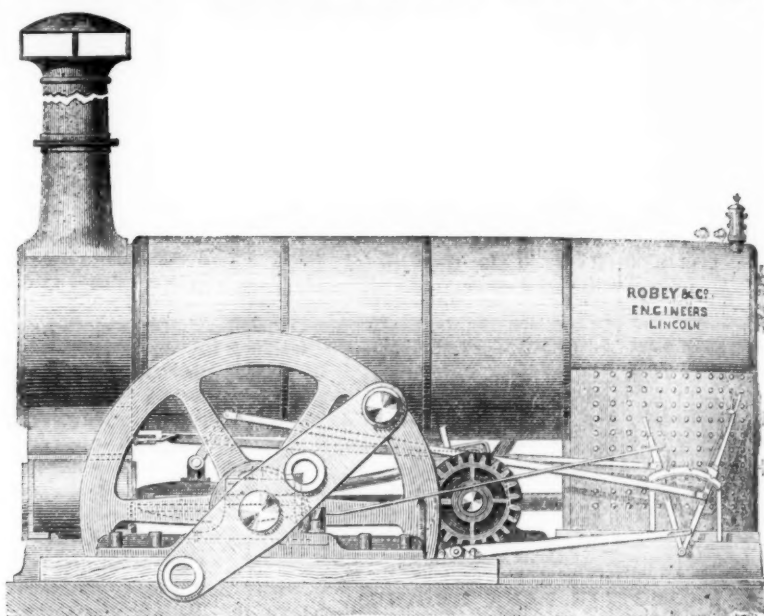
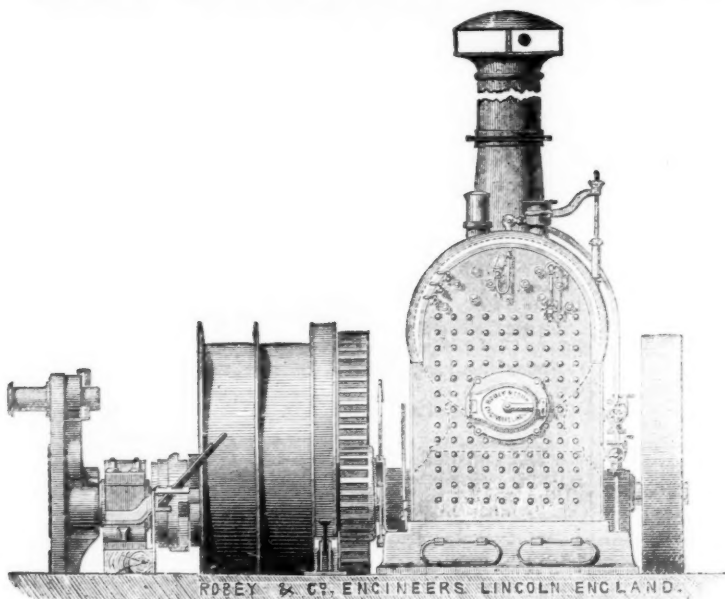
Mining Machinery of every description.

30, KING STREET, CHEAPSIDE,
LONDON, E.C.



Patent No. 4136 : : : : Dated 16th December, 1873.
Patent No. 4150 : : : : Dated 17th December, 1873.

THE PATENT IMPROVED ROBEY MINING ENGINE.



Some of the advantages of the New Patent Engine are as follows:

Small first cost.
Saving of time and expense in erecting.
Ease, safety, and economy in working.
Great saving in fuel.

This New Patent Engine is free from all the objections that can be urged against using the old style of Semi-Portable Engine for permanent work, because it possesses the rigidity and durability of the Horizontal Engine, and at the same time retains the advantages of the Semi-Portable, in saving time and expense in fixing.

This New Engine is admirably adapted for driving Flour Mills, Saw Mills, Brick Machines, Pumps, Ore Crushers, Stone Breakers, and all descriptions of Fixed Machinery.

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CAUTION.—Notice is hereby given, that any person infringing the above Patents will be forthwith proceeded against.

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HYDRAULIC AND GENERAL ENGINEERS.
SPECIALITIES.

PATENT PORTABLE POWER ROCK DRILLS.
IMPROVED

AIR COMPRESSORS & STEAM ENGINES.

MINERS' PICKS, with interchangeable Steel Points.
Semi-portable and fixed Winding, Hauling, and Pumping Engines
HYDRAULIC WINDING ENGINES.

MINING MACHINERY; PLANTS COMPLETE.

Full particulars, with prices and photographs, on application.

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Coal-Getting by Patent Hand-Worked Machinery, WITHOUT THE USE OF GUNPOWDER.

- No. 1 MACHINE - THE HAND COAL-CUTTER, for under-cutting.
2 " - THE ROCK & COAL PERFORATOR, for drilling.
3 " - THE SCREW WEDGE, for breaking down.

The use of these Machines, while doing away with the greatest source of danger, economises at least Fifty per cent. of the labour required in Getting Coal.

Particulars on application to—

MARTIN MACDERMOTT,
SCOTT'S CHAMBERS, PUDDING LANE, LONDON, E.C.

Original Correspondence.

PACIFIC COAST MINING NOTES.

THE FRYER REDUCTION AND AMALGAMATION PROCESS.

SIR.—The Fryer Noble Metal Mining Company's works, located, as previously stated, at Grass Valley, Nevada County, California, were, for the first time, formally opened to the public on the 4th inst., when the machinery was set in motion. There was a large attendance present, amongst whom were many prominent miners, capitalists, editors, and correspondents from every quarter of the State, and from distant States and Territories. The working of the machinery was easy and the results quite satisfactory, and the entire apparatus, being wholly different from that in use in works constructed for similar purposes, elicited no little comment and praise from the assembled visitors. Mr. Fryer, the inventor, and Mr. Hale, President of the Fryer Noble Metal Mining Company, were both the recipients of the heartiest congratulations of those present, and there was but one sentiment uttered, and that was that the new process would inaugurate a revolution in both mining and metallurgical operations that could not fail to benefit the whole country.

In my first two letters I but briefly referred to this invention, on account of my imperfect knowledge of its details, &c. But now that this ignorance no longer exists I will try and present to the readers of the *Mining Journal* a clear and concise description of the whole apparatus, as illustrated by the annexed drawings—Figs. 1, 2, and 3—proofs of which, after the expenditure of much time and trouble, I at last succeeded in obtaining, knowing that any metallurgical process that will cheapen and facilitate the extraction of the precious metals from base ores would command the earnest attention of mining men everywhere. The invention has been patented at Washington, and I understand that the inventor has already filed caveats at the Patent Offices of the leading European nations. This is eminently proper, for the process, as developed so far, promises to richly reward the skill and enterprise that have been instrumental in perfecting and producing it. Its chief merits are the expedition, the ease, and the cheapness attending its operations in dealing with either free or refractory ores. These are three important considerations which should not be lost sight of, on this Coast at least, where in many of its mining regions there are to be found unlimited quantities of highly sulphuretted ores that are rich in silver and gold. By Mr. Fryer's method of treatment all bases become oxides in the furnace, leaving the noble metals in such a condition that very little further trouble is experienced in their extraction, and the unexampled return of 95 per cent. of the assay value of the most rebellious class of ores that have been treated have invariably rewarded his exertions. These results are very gratifying, and exhibit the best evidence that can be produced in support of its claims to public confidence.

The furnace proper—Fig. 1, A—stands 20 ft. in height from base to summit. It is cylindrical in form, and has a mean diameter of 6 ft., and is constructed of boiler-iron, with an outside shell or water-jacket, between which and the inside shell there is a space of 3 in. When the furnace is in operation this is kept constantly filled with water and steam, the latter of which is produced by the heat that is generated from the interior of said furnace. The former, too, has another and important function to perform in keeping the interior of the furnace from being burned or oxidized. The steam passes through pipes to jets in the stack; they are located immediately above the point of its intersection with the top of said furnace. These jets accelerate the expulsion of the smoke and the gaseous products of internal combustion. For purely rebellious ores there is a very high rate of temperature attained in order to reduce the precious metals to a pure state previous to pulverisation and amalgamation. When roasted the ore is introduced to the cylinders by means of openings at the heads or ends, in charges of 250 lbs., in pieces of such size as will enter said openings. The roasting process is dispensed with in the handling of free ores, the pulverising process alone being found sufficient with it. One cord of wood suffices for the roasting of a charge of 3 tons of refractory ore. This is spread in one stratum upon the top of the wood, which is ignited when all is in readiness. The wood is quickly reduced to a heap of glowing carbon, which as quickly oxidises the base metals, and leaves the precious ores that remain behind in a pure state. The furnace is provided with a movable invertible bottom, which, acting upon trenions, facilitates its being turned enough to admit of its contained charge being precipitated into a pit underneath. Air is freely supplied to it while in active operation by means of an opening around said bottom, and the supply can be increased at option by the steam held in the compartment between the shells referred to above.

The cylinders or chambers, wherein pulverisation and amalgamation are effected at the same time and by one and the same operation, are 5 ft. long and 20 in. in diameter. The necessary quantity of quicksilver, hot water, and some cheap chemical not yet known to prevent the former from "flouring," are introduced with the ore charge. All being completed, the heads of said chambers are tightly closed, and the process of pulverisation and amalgamation commences. The said cylinders revolve or rotate transverse to the axis at the rate of ten revolutions to the minute. At the expiration of six hours the chambers are opened, and the pulp, now an impalpable powder, and incorporated with the liquid amalgam (liquid because of the unusual amount of quicksilver used) is discharged through a pipe into a separator, where it is met by a powerful stream of water introduced at the bottom of the separator vat, which keeps the pulp in active motion, while the law of gravitation causes the amalgam to descend to a receptacle at the bottom of the aforesaid separator. After resting here for some time the accumulated slimes are allowed to float off at the top. The amalgam is soon thereafter drawn off and retorted, and in less than 12 hours from the period the ore is first placed in the furnace the result in bullion, 960 fine, is obtained.

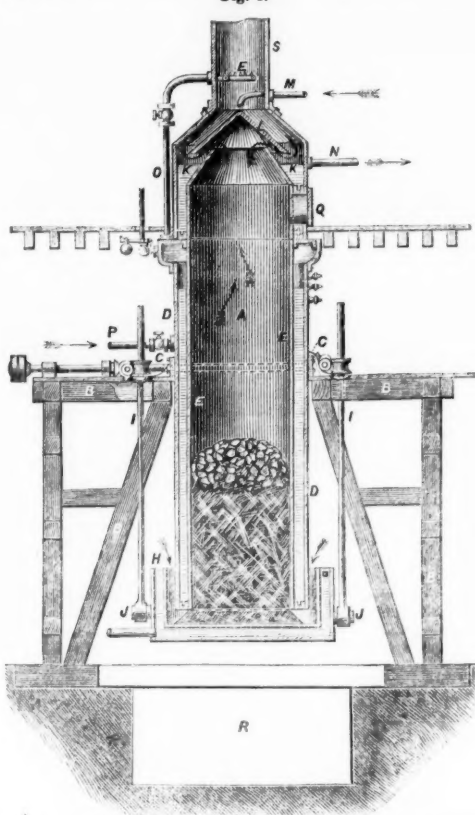
The technical description that follows is given in the language of the specifications that have been furnished with application for patent. The invention, as a whole, is fully illustrated in the accompanying drawings, the first of which represents a central vertical section of the furnace. This, A, is of upright cylindrical shape, open at the top and bottom, and suspended on frame, B, by lugs, C; double shell of body, D, E; inner shell, E; steam jet blower, F, located in stack, S, above the furnace. H is the bottom of furnace, made in the form of an open vessel of an internal diameter larger than the external diameter of the body of said furnace. Said bottom is suspended from the frame, B, by rods, I, connecting them with trenions, J, and with apparatus overhead by means of which said bottom can be raised and lowered at pleasure. K is a double-shell chamber at top of body of furnace, through which shell the gaseous and volatile products pass to stack, S, as aforesaid. L is a cam, located as shown over the upper portion of inner shell of chamber, K, upon which is delivered a stream of water through pipe, M. This water comes in contact with the gaseous products of combustion as they pass in the direction indicated by the arrows, and afterwards falls into the space between the inner and outer shells of the chamber. K N is an overflow pipe by which the water is conducted from the said chamber, K, after it has performed the operation of condensing the volatile metallic and some other products which have been evolved from the furnace, and which are collected in said space. O is a pipe for conducting steam from the space surrounding the body of the furnace to the blower, F. P is a pipe for feeding water to the above-mentioned space.

The remaining operations are as follow:—Wood is delivered to the furnace through the door, Q, until the same is filled to about the height shown, when the ore to be treated is introduced in the same manner, in lumps of any size that will enter said furnace, on the top of the wood, which is then ignited at the bottom. The wood, as indicated elsewhere, is converted into charcoal, after which the whole charge is gradually raised to a high temperature in the presence of a large flow of air entering the furnace between the body, A, and the bottom, H, as shown by arrows, the influx of said air being urged by the action of the blower when sufficient steam is generated. The

effect of all these operations is that the sulphur and other volatile matters are mostly expelled, while the base metals are converted into oxides in the furnace, leaving the noble metals in a comparatively free state for amalgamation. As soon as the charge is precipitated into the pit, R, the bottom is again replaced in the position indicated in the drawing, when it is ready to receive another charge for a repetition of the operation, and so on *ad infinitum*, and is, therefore, as accurate as could be obtained under the circumstances.

Now we come to the pulverising and amalgamating department, the apparatus of which the subjoined drawings will illustrate. We

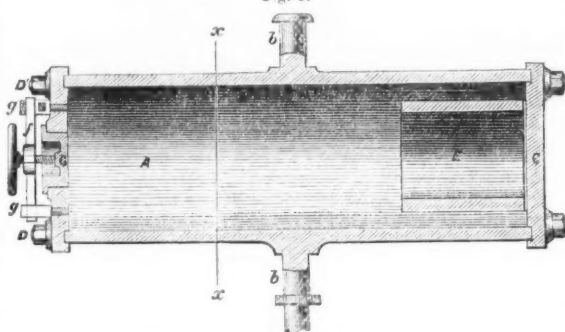
Fig. 1.



FURNACE USED IN PRELIMINARY STAGES OF THE FRYER PROCESS.

will first describe a single chamber or cylinder in which ore can be pulverised without amalgamation, or be amalgamated after pulverisation, or, at the same and by one operation, be both pulverised and amalgamated. A single chamber is arranged to rotate, revolve, or oscillate, as shown in Fig. 2, upon or about a horizontal axis, and a weight or ram so placed within the said chamber that by rotation,

Fig. 2.

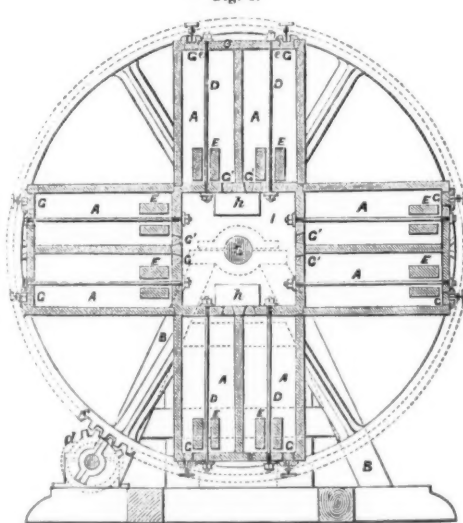


SINGLE CHAMBERS—FRYER PROCESS.

revolution, or oscillation of the said chamber the weight or ram will be caused by gravitation to have a reciprocating motion, falling from one end of said chamber to the other end thereof. This weight or ram may operate to produce pulverisation, amalgamation, or both, after the ore has been placed within it, by falling upon the ore at the opposite ends thereof, or by subjecting the ore to attrition between the ram itself and the sides of the chamber.

There may be, if desired, a series of radial chambers placed around a transverse axis, as exhibited in Fig. 3, about which they move, and a

Fig. 3.



CRUSHING AND AMALGAMATING CHAMBERS.

a series of weights or rams arranged to reciprocate by gravitation within said chambers, operating essentially as in the single chamber above described. Such a combination of a series of chambers and their contained weights or rams moving around or about a common axis enlarges the working capacity of the apparatus without inconveniently adding to its bulk, or to the space required for its operations.

COMBINATION CHAMBERS.—There may also be a centrally arranged separate amalgamation chamber, from which radiate a series of pulverising chambers with contained weights or rams, the said chamber moving about a transverse axis common to them all. By these means ores may be pulverised or amalgamated without loss of either ore or metal contained therein during such treatment. Having now given the objects and nature of this invention, its construction will be more readily understood by reference to the accompanying engravings. Single chamber, Fig. 2, A, working chamber, closed by ends or heads (C), and supported and travelling on trenions (b b), to one of which prolonged is attached a gear-wheel driven by a

pinion (D D), longitudinal bolts binding together the heads (C C G); door or stopper secured by cotter-bar (f) and stirrups (g g) and rack-wheel, S, weight or ram, which, by its own gravity, reciprocates from C to G as the chamber moves. For charges of about 250 lbs. of ore A is about 5 ft. by 20 in., and revolves about 10, S there weighing about 230.

RADIAL CHAMBERS.—Fig. 3, A, represents a series of chambers each with its containing weight or ram (E). In this plan E slides upon guide bars, D, and is of different shape from Fig. 2. Either or other forms of E can be used, as circumstances require; G doors or openings, as in Fig. 2; C wheel, and d pinion by which power is applied. When it is desired to pulverise and amalgamate separately the chamber, A, may be used for the former, whence the pulp may be admitted through the valves or doors, G G, into the separate amalgamating chamber, I, to which (h h) are discharge doors or valves. When using either form of chamber the ore is introduced through G in pieces of from brick size downwards with a proportionate quantity of warm water, quicksilver, and necessary chemicals, and then the apparatus is set in motion. The weight or ram (E) reduces the ore both by percussion and attrition. When the ore is pulverised and amalgamated it is dumped from the cylinders and passes through a separator which retains the quicksilver and amalgam. The pulp then flows through copper-lined cylinders, as an additional precaution against loss.

San Francisco, May 8.

J. D. POWER.

THE RICHMOND MINE, AND ITS MANAGEMENT.

SIR.—Mr. J. D. Power admits that Mr. Probert's honesty is unimpeachable, and so is the sincerity of his purpose. Does it not strike that gentleman that those very rare but necessary qualities render him an objectionable personage, whose presence cannot be tolerated by those who wish to manage the Richmond as other American mines have been managed. Mr. Power brings several objections to Mr. Probert's management, but those who attack should be sure of the correctness of the premises upon which they base their attack, or they will find all their superstructure fall to the ground. He makes Mr. Probert return to the mine in June, 1875, so as to give Mr. McGee credit for the returns up to that date. It so happens it was the year 1874, and Mr. Probert left in March, 1875. During the six months ending February, 1875, when Mr. Probert had the sole management of the mines, he made a profit of \$80,000, whilst for the six months previously, during Mr. McGee's management, and for the six months after, during Mr. Rickard's management, the profit was about half the amount. The proof of the pudding is in the eating, and this conclusively proves Mr. Probert's successful management. I believe in success, and I have good reason for believing that in future Mr. Probert will, if anything, outshine his previous brilliant management.

AN OLD SHAREHOLDER.

THE EMMA MINING DISTRICT—THE GREAT EMMA VEIN.

SIR.—When I was about publishing the pamphlet on the Emma Mine some of my most intimate friends endeavoured to dissuade me from such a rash act. They firmly believed I should be looked upon as a madman in upholding this mine. I had studied the whole case practically on the spot from 1871 to 1874, and made a speciality of it, as I am fully aware that it would eventually become a *cause célèbre*, and possibly my evidence might some day be required. I, therefore, put all my zeal into the case. When Mr. G. Anderson, M.P., the then chairman, came out to Salt Lake City, I endeavoured to convince him that unless Mr. Warren Hussey, the local manager, was dismissed there would be before long a crash that would bring ruin on the character of the English promoters. I spoke in very strong terms to Mr. Anderson; but, for certain reasons, Mr. Anderson, unfortunately, looked upon me with suspicion, as acting under some interested motive, so I gave up all idea of convincing the chairman. About this time I commenced my pamphlet, in consequence of having testified in Court, before Chief Justice McKean, "that the Emma vein in the Emma Mine exhibited distinct and marked characteristics of a well-defined segregated strata vein, and that future developments would prove the Emma vein to be identical with the vein in the Flagstaff and other mines lying on the same mineral belt or strata vein. In the pamphlet, page 30, I gave all the facts proving the Emma vein (I speak here as a whole)—that is, the vein as including all mines on it, the Emma as a master vein, as we would speak of the Comstock vein. I am rejoiced at seeing so many facts and proofs brought forward in the Journal, proving practically that the Emma vein (I do not allude to the Emma Mine), which includes the Emma, Flagstaff, South Star, North Star, Vallejo, and Titus Mines, are all on this one monster strata vein. I quote from the City Article in the *Mining Journal* of Feb. 19, 1876—"That the miners had broken into the South Star and Titus claims, and that this is an important fact as establishing an unbroken connection between the Emma and Flagstaff Mines, whose discoveries are several thousand feet apart." This is what I testified in 1872 in the suit against the Illinois Tunnel Company. I again state that the Emma vein—with its several mines occupying a length of some 16,000 ft., as stated in the pamphlet, page 30—is destined to be a great district, provided English shareholders will stick to their mines, and not be panic stricken by every little rumour that is set afloat. Let them show, as I state in the pamphlet, as much pluck as American shareholders have shown on the Comstock vein, and they will find it will pay them handsomely in the long run. Kindly publish here, with this letter, what I stated before leaving London, in October last, with reference to the Bay City Tunnel, that my calculation was that only 260 ft. (horizontal) were wanting to intersect the Emma vein on the Emma company's property. Mr. Attwood when telegraphed to respecting the rumours that the Howland tunnel had cut into the Emma Mine, stated that the end of the Howland tunnel was some 3000 ft. distant from the deep workings of the Emma Mine. This was correct, but why did he not inform the board in the same telegram that there was another tunnel, called the Bay City tunnel, within 200 ft., then, of the Emma deep workings. In consequence of this evasion I published, and informed the English public for the first time, that this other tunnel—the Bay City tunnel—would cut the Emma vein within four or five months.

Mr. Attwood states that the Bay City Tunnel is 500 ft. from the Emma deepest workings; this is as much to be depended on as everything else he has stated about the "exhausted mine." I imagine his energies in deliberately running down and depreciating the mine is the only thing I find exhausted—panned out. As regards the ore recently discovered in the Bay City Tunnel, producing only \$15—this is another of the many ridiculous assertions—the deeper the workings have gone in the Emma Mine the richer the ore. I sent you in 1874 some 10 telegrams from Salt Lake, through Mr. W. J. Lavington, which cost me about 180l., giving you the fortnightly sales of the Emma ores. There were sold from the deepest workings some 30 tons, which averaged \$1000 per ton, and several hundred tons, about \$400 per ton. This is the case with all mines or limestone formations all over this continent, which I happen to be practically acquainted with since 1851—that the deeper they go the richer the ores become. I have some very strong data for knowing that the Emma Hill will produce richer ores as depth is attained. I trust the present board will not lose sight of Chief Justice McKean's decision, to be found in the pamphlet, p. 32—"That the patentee or owner of a mine may follow the vein or lode with all its dips, angles, and variations to any depth, and to the entire length of its sett, although it may enter the lands adjoining." Mr. Attwood informed the shareholders at the meeting on Feb. 5 of a fact (fallacy) that would mislead many who are not acquainted with the facts. When asked how far away the ore was found in the Bay City Tunnel, his answer was 500 ft. to the north-west of our lines. The inaccuracy of all these statements, as I remarked in my pamphlet, will come to light now very soon; the denouement is at hand.

Lima, Peru, April 21.

HENRY SEWELL, M.E., F.R.G.S.

P.S.—I have no interest of any class in writing about the Emma district. I hold no shares, nor had I anything to do with the promotion. My interest is to serve truth, and prove that I endeavour to post myself up in any work in my profession which I happen to undertake. Mr. Attwood stated the mine was exhausted from the moment his management commenced; he is bound to adhere to what

We have in Cornwall noble hearted, benevolent, liberal, and discreet landowners; they have on several occasions reduced the duties, and in a few cases voluntarily, but amongst our lords one cannot but admire such disinterested men as Lord Roberts and Mr. Basset. Were the matter of an assay office brought to the notice of these gentlemen, with its concomitant advantages, instead of one office being erected we should have two, Lord Roberts taking especial interest in the town of Redruth, and Mr. Basset in Camborne; if the offices were built I feel confident that the mining gentlemen of those towns would readily supply the interior requisites of proper assay offices. Mr. St. Aubyn, of Clowance, would undoubtedly supply from his laboratory probably the largest in Cornwall not a few articles.—*Gwinear, May 30.*

THE COPPER STANDARDS

Sir,—I have read with considerable interest your able article upon this subject in last week's Journal, and since the matter has been broached by reliable authorities, I would ask permission to address your readers, more especially our captains and the representatives of mining properties, upon this all important question, or perhaps, more correctly, if epigrammatically speaking, offshoots of the same topic. As you rightly observe, it is "really marvellous" the exact correspondence and similarity of the prices offered by our smelters for parcels of ore. Fortunately, this at once furnishes the text for my short dissertation, and without any further preamble we introduce the lecturer. The very fact of consensus existing between us demonstrates a proof most convincing that rule and method are followed by the institution for the purchase of ores, hence prices giving a uniform percentage justly reap their reward, and any material not passing the muster is justly rejected or only a nominal price offered. The question now arises how to get the best results, which are no secrets, neither are they mere chimera or flimsy excuses, solutions, or clerical ignorances; albeit methods I can with confidence assure that not more than one of twenty mining representatives intuitively or practically understand, or can work out the same results as our copper standards. *document*, steady, hear me out, pray do not get excited, the meeting has hardly commenced, and is in an uproar already, with actual violence, more or less captains enraged, electrified, and upon their legs, thirsting to assert that they know far more than the lecturer, and have mastered and acquired every thing that can be attained pertaining to copper selling and buying. Perhaps, but I fear it is the most assuredly those who truthfully confess ignorance will benefit their cause, and grievous errors have been or are now being made, and if ignorance cannot be cured, *sinners* and wilful perjury. *Tempora, O mores*—then they are actually guilty of *logged* offences and the Far West was boasting of only a few days since one of our noted mining captains of the Copper Process, he was "too sharp for this" and "no 2 per cent. ores for the "Nascents" two," and no low class stuff was to be found upon his mine, as he mixed the ore with the rich, and sold the lot. "No Nascents, means for the

RESIDENT

Mr. Editor, I pause for a moment. The *Minning Journal* is read in almost every corner of the wide wide world; these few lines will I know be pursued by a million thousands, and, I feel duly and demurely state, challenging the many to confute my arguments, that at this very day poor ores are far adobly mixed with rich ones, re-ceive no value, and the rich is actually dejected, similar to the spoliation of good wine mixed with bad. I have no doubt, if I sit down, I like you earnestness, it shows attention, but let the returner quietly say, "No, for you will have ample opportunity of responding by and-by, as our worthy friend and editor of the Journal, is always imptid and ever-villing to give the other a fair hearing. You shall not long be deained. Every statement put forth should be founded upon facts and proved by figures, and were this always carried out, much controversy would be avoided, and the many converse I with but little of the same opinion. We have, therefore, first, to deal with facts, and who will mix 50 tons of ore mixed with poor, with the action is proviered, and every day contempts, and to use the words of the *Minning Journal*, glorified? Now for figures, and the copper standard we will still expressive words, take the average produce of the country, 7 per cent., and estimate the value for sale 4½ per cent. copper ore, and a standard of say, 131½, 2s. per ton, and to take the average produce of the country, 7 per cent., and estimate the value of 50, 4s. 2d., less return charges 2s. 15s., equal to 2s. 9s. 2d. per ton; calculate 50 tons of 4½ per cent. ore at 3s. 9s. 2d., and we have 122s. 18s. 4d. for the prod., it happens that, independent of 50 tons of 4½ per cent., "Gusin Jack" has 50 tons of 1½ per cent., and we have 177s. 6s. 8d. for the prod., but I will not sell by itself; there is, however, a rule or rule equal for the difference of a little study the true version can be arrived at: with a standard of 131½, 2s. per ton, and 131½, 2s. per ton, for 4½ per cent., the smelters, as an inducement to attract more business, for their rule of figures, give a standard of 177s. 2s. for 1½ per cent., or equal to 2s. 13s. 1d. per ton, but deducting 2s. 15s. return charges, a debt is left instead of credit, and only when the price of copper metal is very dear, and the standard exceptionally high, will 1½ to 2 per cent. sell at all. We thus see that 4½ per cent. worth for 50 tons by the ordinary rule of arithmetic, 122s. 18s. 4d., or 50 tons of 1½ per cent., worth 177s. 2s., are clearly if we mix the whole together and make 100 tons as equal to 3 per cent., decided to be 177s. 2s. per ton. Let us take: a standard of 131½, 2s. per ton, or, less 2s. 15s., or equal to 2s. 9s. 2d. per ton; a standard of 131½, 2s. per ton, multiply this by 100 tons, result 118s. 6s. 8d., against 122s. 18s. 4d., or a loss of 4s. 1s. 8d., and memory must not fail to recollect that there are the charge of carriage, crushing, sampling, and several times handling 100 tons instead of 50. Kindly close the doors, I observe several individuals sneaking out, whilst ejaculations are muttered "Impossible," "Barnard's will calculations," "figures wrong &c.; test them yourselves, and in the meantime I will calculate 50 tons of 1½ per cent. and 50 tons 2 per cent., sold separately or together. Now whereas 13 per cent. is equal to 177s. 2s. per ton, 1 per cent. is, or is 95s. 18s., or 95s. 18s. per ton, or, less 2s. 15s., or equal to 93s. 2s. 9s. 2d. per ton; and 50 tons of 1 per cent. the standard of 2 per cent., equal to 154s. 2s., or 3s. 1s. 7d., less 2s. 15s., equal 6s. 7d., with the present high standard 2 per cent. is worth 6s. 7d., or 10 tons equal to 15s. 9s. 2d., add this to 55s. 17s. 6d., equal to 573s. 6s. 8d. Now take the average of 50 tons 10 per cent. and 50 tons 2 per cent., or equal 100 tons 6 per cent. Standard 108s. 2s., price per ton 6s. 9s. 7d., less 2s. 15s., equal 3s. 14s. 7d., or multiplied by 100 tons, equal to 572s. 18s. 4d., against 573s. 6s. 8d. The result here is only a small loss of 8s. 4d., but there is the cost and labour for nothing, and it is also a waste of time, and mixing equal quantities of 2 per cent. and 10 per cent., but much of the latter as the former were found most of the mines would pay dividends instead of calls.

MINING IN QUEENSLAND.

You seen astonished, my friends, and suppose we make a final calculation, basing upon the fact that more poor than rich ore exists, which will further prove my argument beyond the shadow of a doubt. Take for instance that a mine has 30 to 7 per cent. ore and 150 tons 1½ per cent.—not at all an unusual occurrence. The standard of 7 per cent. is 1044, 195, 31., or 77.8 per ton, less 27 1½., equal to 1016, multiplied by 30 tons, equal 2590. For 1½ per cent. the standard is 195, 18.3 or 27.17, 41 per ton, less 27 1½., or 28.41 per ton. This result has no more to be added to the 2590, equal 2618.41. The 50 tons 7 per cent. and 150 tons 1½ per cent. equal 230, equal 247. 19. The 50 tons 7 per cent. and 150 tons 1½ per cent. equal 230 of 23 18ths per cent., or 93.44 per ton—a money value of 303.68, 81., again 247.19. Facts and figures both prove that the 1½ per cent. is worthless to be sold; even far worse results are obtained when passed off mixed with good ore and it is well known that to attempt to dress 1½ copper by water need 2000 ore concentration is a message miserable affair, and more ore and money are lost by the transaction than saved. What is to be done? Ay, there's the rub, let others now have their say, and I shall have much pleasure in summing up the results of the various opinions, and then we will see what is to be done.

Was it fancy, or did I not hear of old murmuring question as to whether smelters would for their own benefit rather have more low than high class ores? do not happen to be honoured with their confidence, and this looks like a random shot; but severe shot; however, now is not the appointed time for going into the particulars of the why and the wherefore of low class ores and high class ores happening to be associated together, neither need we now discuss the fact that for years thousands of tons of copper ores were purchased, containing arsenic, sulphur, and even tin, without the smelters generously proclaiming it a trick? No, they simply answer one question by asking another—Will it suck?

THOMAS J. BAILEY.

CARDIGANSHIRE MINES, NEW AND OLD—No. VI.

Sir,--If we look at the very inexpensive mode of working the mines in this county--the pumping, crushing, drawing, and dressing the ore all being done by water machinery in the mines, of which I shall endeavour to give a few particulars--I think many of your readers, as well as myself, will be at a loss to find out how "Hard Times" should now be existing in this district, and that they would begin to think with the writer that "hard times" should now put a stop to, and that better times and dividends, in the shape of profits, should be the order of the day, instead of continual calls for losses, as has been the case for some time past.

First, we will go to the westward and take Bronfloy. Now, we look at the price of ground for driving, which may be taken on an average at (say) 7L per fathom, and 3L 10s. per cubic fathom stopping (these prices are quite high enough, and I am sure the miners would be satisfied and pleased with them), we shall be a loss to know why ground which, on an average, is valued at from 15L to 20L per fathom, should not result in some profits to the shareholders. The prices for driving and stopping will hold good also at South Durran, but as the mine is a little deeper we will stretch a point, and say 9L for dressing and 4L 10s. for stopping. Now, all the ground taken away for some time, according to reports, will average 20L p-r fathom. May I ask why not have a little profit from this?

Gagman is opening out some ground that must be taken away some considerable profit, and the shareholders should begin to re-joice from what they have sown. At Powell United such courses of action are being laid open that cannot fail, under any circumstances, to give a good percentage on the capital invested, and the returns,

there is any truth in rumour as to the richness of the ore ground, must increase to something respectable. The same remarks would apply to De Broke; and the next time that I write about each of these mines I hope to see my predictions fully realised, and they will be, as far as it is possible to judge from the prospects of the several properties mentioned.

I have been taking the bright side of the question. In my next I intend to offer a few remarks on the mines not giving profits, and I shall then in liquidation and standing idle in the market-places. I will not go now into detail about the prospects of the latter, but I will give a hint to all those interested in them to "look before they leap" out of them altogether, for if they once get out they will find it rather awkward to get in again, unless upon such terms as the intriguers may dictate, and which might possibly be considered "very comers may dictate, and which might possibly be considered "very hard times;" but the mines are good, and, properly tried, will cost but little money, and this is known to more than one "Miner" in the county, and who probably asked last week—"When doctors differ who is to decide?" To this I would answer—"The patients must judge for themselves."

Goggin, May 31.

IMPROVED PROCESS IN TREATING ORES.

Sir,—Under the above heading I read in last week's Journal a description of Messrs. Oxland and Hocking's Patent Calciner for Roasting Ores. At page 922, vol. ii., of Muspratt's "Chemistry," I find a precisely similar furnace—there being some minor differences as to the modes of charging and drawing only—fully described and illustrated, which was patented in the year 1853 by Elliot and Russell for making blackash. Many such furnaces are now working in the Wiltshire and Warrington districts heating various ores. Some 14 years ago a furnace similar to that described in the Journal was erected in North Wales. Under these circumstances I am curious to know why Messrs. Oxland and Hocking claim this furnace as their invention and patent.

A. R.

Birmingham, May 31.

BIRMINGHAM BLAKELY HALL COAL AND IRONSTONE COMPANY (LIMITED).

Sir,—Being an unfortunate bondholder in the above company, and having been deceived, as I consider myself to have been, by a delusive prospectus, I think it would be advisable to call a meeting of bondholders to consider if counsel's opinion ought not to be taken for obtaining redress. It is stated in the prospectus that the company would at once enter upon the following receipts:—Raise 4000 tons of coal weekly, making a profit of 16000 per week, or an annual profit, reckoning only 40 weeks to the year, of 640,000, whereas, if I am correctly informed, the colliery never during the time it was working paid its own expenses. The capital of the company was stated to be 220,000, whereas there was no money at all subscribed besides the 100,000 debentures—a fact if I had been aware of I certainly should not have invested my money in it. If statements like these can be made with impunity for obtaining money from innocent investors, the sooner the Limited Liability Act is abolished the better.—West Bromwich, May 30.

BONDHOLDER.

WEST CHIVERTON MINE.

Sir,—In reply to "W. J. T.," I have much pleasure in being able to announce that the new leases have been completed.

Gresham Buildings, May 29.

GRANVILLE SHARP.

GROGWINION LEAD MINE.

Sir,—May I ask through the Journal if the present company are continuing to drive their present deep adit cross-cut north; and if so can anyone acquainted with the district tell me what are the probabilities of finding other profitable lodes to the north. I hear the last discovery of this company—the No. 4 lode—has been cut in the 24 ft. level, and is worth 2 tons per fathom, and that the same lode will soon be seen in the 95 ft. level. What I want to know is if there is a No. 5 lode yet ahead of this No. 4, as three years ago the present company did not know that they possessed a No. 4 lode. I want information from those who know the features of this district.

London, May 31.

L. L.

DEPOSITS OF COPPER AT NANTLE VALE, CARNARVONSHIRE.

Sir,—In one of my former letters I said that at Drws-y-Cod Mine, which is situated at the eastern end of the pass, the lode is broken off with cross slides, and suddenly reduced to the level of the valley. In this, as in Symde Dylluan Mine, the chief deposits of copper are found in connection with the slides, and also where the surrounding rock is lying in a horizontal position. This, like its sister mine, may be divided into two sections, having two distinct converging courses of ore, but they differ in this respect. Here they dip in one direction, but with a difference of angle; there they dip in a contrary direction. In the western section the principal slide has the same dip and bearing as the side of the mountain where the lode has been cut off—that is, the horizontal angle about 45° west of north, and the vertical angle about 30°. It does not appear to carry along the copper from one lode to another as the principal slide does at Symde Dylluan, but the lodes almost invariably produce copper where it strikes across them, especially where the lode is of a soft nature. Sometimes it makes deposits from 5 fms. to 10 fms. high, and from 3 fms. to 4 fms. wide. It is remarkable that these deposits make upon the slide, and scarcely ever under it. This section has been worked on this slide from the top of the mountain, or nearly so, down to the 80 ft. level—a distance of nearly 200 fms.—and, with few exceptions, with profitable results. The last 20 fms. sinking on the south lode yielded many thousands of pounds worth of ore, and although now pinched a little at the 80 there can be no doubt that it will open out again, as it always has done after such a change.

At the eastern section of the mine, in the shallower levels the ore has been deposited chiefly where the strata are lying in a horizontal position, the copper extending away from the lode between the beds of clay-slate for a great distance. One of these in particular occurred about the 20 ft. level, the history of which is rather interesting. About a century ago the parties who then worked the mine sunk a winze several fathoms in hopes of finding one of these carbonates, but as they had nothing but hard country rock it was abandoned, and that part of the mine closed up. Many years after the water was again drawn out, and this winze resumed; when 18 in. from the bottom they struck on a large bed of solid ore, producing from 18 to 20 per cent. of fine copper. At the deeper levels, where the strata are less contorted, the ore keeps more regularly with the lode, being thrown in an easterly direction, dipping about 60°.

These converging courses of ore will form a junction about 20 fms. below the present bottom of the mine, and, should it be worked to that depth, I have no doubt that there will be found a magnificent course of ore.

JOHN ROBERTS.

Nantle Vale, North Wales, May 27.

"CIRCULAR" MINING.

Sir,—I am but a poor country parson, who happens to hold a few shares in some four or five good mines. Though a reader of the Journal for many years it is but lately that I have made any underground ventures; and since I commenced some few months ago to take a passive interest in mining I have found that I am on all sides surrounded with friends (?) who are urging their "good" things upon me. In two or three months I have received circulars from four or five different dealers setting forth the claims of various promising undertakings. With regard to one of them no less than three of the circulars, containing a plan of the district, showing that the Van lode must communicate with it, further stating shares must rise, property most valuable, that I should never have such a chance again, and the writers almost going on their knees begging me to take shares; and, not only this, they also enclosed a form to fill up, leaving me to state the number of shares I should require. How very kind—how very disinterested! Were I in the position of these

dealers I do not think I should be so liberal with my advice. If I knew I had a "good" thing in store, and could not afford to subscribe to it, I should without any hesitation hand it over to my relations, and allow them to reap the benefit of my knowledge, and not put myself to the expense of sending out circulars by post.

I fear these dealers will think me very ungrateful in not replying to them. The only thanks they get is from Mary, my maid-of-all-work, who clears my waste-paper basket every morning.

COUNTRY PARSON.

THE PENNERLEY MINE, AND ITS DETRACTORS.

Sir,—I notice a letter signed "Enquirer" in last week's Journal concerning this property, and his indignation at brokers' circulars, &c. He seems to take it as a personal affront that Pennerley Mine is spoken well of. I do not think, on a second perusal of his epistolary production, that he is a "bear" of these shares. This would be a too dangerous experiment altogether; but I am thinking that he is a buyer at depreciated prices, if he can only manage to work the ore in his favour. His statement that the mine is only returning 54 tons of ore per month will soon be changed into double that amount, and should the ore in Potter's Pit be struck, as anticipated and expected from the locality (the first in Shropshire), and from the great heat found below indicating a vast body of ore at hand, the mine at once becomes a second Tankerville. If your correspondent would take the trouble to go to the mine he will find that the tributors lately put on have returned just 60 tons of ore in about a fortnight, and this is quite independent of the regular amount of ore. More tributors will at once be put to work, and with the great discoveries hourly anticipated Pennerley will be the great speculation of the coming summer. Capt. Harris and Delbridge in their report of May 17 state:—"That the winze and slope west of cross-cut in the 75 maintain their value—3 tons of lead ore per fathom, and that the lode is very speedy, and from the excessive heat below that a large body of ore must be at hand, and closely, too." On May 23, by last report—Engine Shaft: In the level here, 120 east, a winze is commenced on the course of ore already found, and the lode is 2 ft. wide, and worth 1 ton per fathom. The discovery in the 45 has now become a rich course of lead ore, and is fast improving, and deep level is entering a large deposit of ore. Now, with so many splendid chances of discoveries in all parts of the mine it may be safely conjectured that a prosperity is coming to this adventure second to none. No sane man would judge of a mine's value by its past history or production, we always look to its future capabilities of success. Touching the rich Tankerville Mine, no valid objection can be raised against the probabilities of Pennerley becoming as rich, and this in a very short time. Daily information of a tremendous strike in Potter's pit is expected by all who know the district. The returns of Pennerley will exceed in future the most sanguine views. Any great opening of wealth known to exist in it would send the price upwards in spite of "Enquirer's" almost spiteful criticism. I am heavily interested in several mining enterprises, hold a fair interest (in a moderate sense) in Pennerley, and am confident we shall do wonders here within a brief period.—May 31.

FAIR PLAY.

PENSTRUTHAL MINE.

Sir,—A mine situated in such a position as this property, in the heart of the Radnor district, and between two such mines as Buller and Tressavean (and a rather dry mine in addition), deserves much notice. Those well acquainted with the district expect such a discovery as that which is now coming off—that copper is appearing in every part of the mine. Penstruthal can again blow the trumpets, writers and jobbers may again boast its praises and extol its fame. No doubt a rich course of copper lies at the bottom of the shaft from such a locality; and if so, we may expect to see Penstruthal take the position intended originally by the promoters, whose judgment was excellent. Potentially has been tried sorely by holders of these shares, but expectations will all be realised shortly. We may anticipate the value of the lode in Highborough shaft will ere long be declared when cut. Capt. Teague's opinion of this mine has always been very high, and the enormous profits made in its some years since in a parallel lode, when upwards of 84,000, was netted in profits, confirms this hope most strongly.

COIN WALL.

THE WILD DUCK, OR SPORTSMAN'S ARMS, MEETING.

According to agreement, the "old pare" met, and had a fine basin of broth, well stuffed with cabbage and turnips; ample justice was done to a splendid leg of mutton, and when all had finished Jan Temby said, "I tell ee what, some people may say what they mind to, but I say there's no good fellowship in eating as in drinking; and there's no more harm in having a good dinner once a month after working all that time as hard as men can work in wet, cauld, old places, and risking our lives in rummaging old pitches—that dandy young miners would be afeared to smell to—that going to mitten or preachen, for we don't get drunk or mased, or interfere with anybody, and if we wish to discuss the point between ourselves it is nothin to nobody else." "Thee art right, Jan," says Jimmy Down, "but while the maid is clearing away the things, shall I tell ee the trick Jim Bray served Nicky Oppy last week?" "Oh, iss," says all the pare, "less av'n, Jimmy." "Well, you all know both men," says Jimmy. "It was saturday at Wheal B—r; Jim Bray met Nicky Oppy, and said, 'Were't a going, Nicky?' 'Going,' says Nicky, 'why, for sist, to be sure.' 'And how much sist dost a git?' says Jim. 'A pound,' says Nicky. 'A pound,' says Jim; 'is that all?' 'Iss,' says Nicky; 'how much dost thee git?' 'Why, I always git two pound,' said Jim. 'And how dost thee git two pound, and other men only one pound?' says Nicky. 'Well,' says Jim, 'I don't mind telling thee the secret. I swear and cuss pon the capns and clerks, and I very soon git my two pound; and thee's goes in the count-house and do the same, and thee's be sure to have it.' 'Oh,' says Nicky, 'if that's the way I'll soon try un.' In went Nicky, and very soon a pound was handed to un. 'What's this?' says Nicky. 'Your subast,' says the clerk. Says Nicky with a great oath, 'Is that all?' 'What do you mean?' says the clerk. 'Mean,' says Nicky, 'with another great oath, 'that I'll have two pound sist. Like other people,' and Nicky kept on swearing, and cussing, and kicking up such a row that the manager come out, and said 'What's all this?' Nicky begun to swear again. 'Spale the fellow a guinea,' says the manager, 'and if I hear any more noise discharge him at once from the mine.' This only made Nicky swear more than ever, but before he know'd where a was he was turned clean out of the mine. When Nicky come out of the count-house that sly rogue Jim was waiting for'n round the corner, and so soon as a seed' Nicky a made up a long face, and said, 'Well, how des't a git on, ole fellow; thee's got thy two pound, des't a?' 'Odd, darn thee, Jim,' says 'Nicky,' 'why, I spaled a guinea, and turn'd out of the bal; and what am I going to do now; dost a know? Thee's told me thee's got two pound by swearing and cussing pon the capns and clerks.' 'So I did,' says Jim, 'but I didn't swear out hard pon them; 'twas only in my mind like.' 'Well,' says Uncle Henry Treylon, 'that beat all I ever heard, and how del poor Nicky git on afterwards?' 'Why after a week or so,' says Jimmy, 'it was told to the manager how poor Nicky had been fooled by Jim Bray, and all the capns and clerks jest sat their sides loffen, and took off the spale, and put un to work again.' The pare being now comfortably settled for a smoke and chat, Cousin Will said "I have been thinking since we last met what a vast unexplored mineral field there is in the parishes of Illogan, Camborne, Wendron, Crowan, Gwinear, &c. It is quite true a few good mines have been found in each of the above parishes, but they are nothing when compared with what remains undiscovered, and the question is, though we know the general run or direction of the great lodes of the districts, how is it that new mines, and good mines, are not now discovered as well as in former times? Our forefathers made enormous fortunes in our mines without the pretence of a tithe of the scientific knowledge of the present day, and with the rudest kinds of machinery and appliances. They not only discovered the mines, but worked them profitably. I ask again—Why are not new and good mines discovered now? Has a 'new mine,' in every sense of the word, been discovered and successfully worked within the last 100 years? If not, and I think not, then with all our boasted scientific knowledge, and wonderful discoveries and inventions, it is clear that we are not so able miners as our forefathers. Some may sneer at the idea of lodes being first discovered by 'dowsing.' Well, if they were not, perhaps learned friends will tell us how they were discovered. We don't care a straw; only let new lodes and new good mines be laid open, for I would rather have the cream of one good new mine than all the old mines, or most of them, put together. It was the cream of 'new mines' discovered by our forefathers that enabled them to make large fortunes, and it will be the cream of 'new mines' that will make the fortunes of the discoverers of the present day, which is far better than losing shiploads of money in deep exhausted old mines, but, if not exhausted,

too expensive to work to pay any profit worth talking about." "Now that," said Jan Jewell, "is what I call sound discourse. In the different parishes there is bals enuff to put 10,000 men and boys to work, but the baffle-head fools would rather throw away millions in Furrin parts than spend a shillen in new bals at home, when they could make fortins like the old people used to, and hundreds and thousands of our best men obliged to suffer misery in Furrin countries. Why I tell ee, sose, no Furriners can come up to we, or match our new bals if we work them fitty. Now, jest see how many new good bals you could find in 'High Downs,' near Hangman Burrow, Bolenowe Carn, the top of Chycarne Moor, where I have seen with my own eyes great rocks up to grass with grains of tin in un so big is sparables. Then there is Craft Mitchel, Boswidlen, Halligan, and all the ground running down to Crenver and Wheal Abraham; and this, comrades, as you all know is new, whole ground, full of lodes and good bals. People may laff about dowsing if the mind to; we are sure the great master lodes run through they places, but if they aren't cut by dowsing why let them be cut some other way; we want faal out with any man, woman, or cheel for finding a good bal, but I say tes a burning shame for our miners to be drove out of the county to the end of the world to get a crust of bread while we have scores of miles of lodes never yet touched." "Iss, sure," says Jimmy Down, "and how many scores and hundreds of little bals is in all directions—worked a little—and if worked fitty with care would soon be big rich bals. Why the people must be wust than mazed to throw away their money abroad, and going about day after day stanken pon cooses of copper and tin." "I consider," says Jan Temby, "that the be wuss than Neddy M—I, and he drove a cross-cut to put the deads in from another end." "I think," says Cousin Will, "as we are about to part, men, that no man can find fault with our proceedings since we met, and at our next meeting I hope we may all have something to say to each other which will be mutually beneficial."—Cousin Jack's Unpublished MS.

ROADS, STREETS, AND PAVEMENTS.

Few things, probably, are more conducive to the successful opening up of a new country than the judicious laying out and proper construction of roads, and as it is not at all times possible to procure the services of an intelligent road engineer, such works as that of Major-General Gillmore* are almost invaluable. He has been careful to give such descriptions of the various methods of locating country roads and of constructing the road and street coverings in more or less common use at the present day as will render the essential details of those methods, as well as certain improvements thereon of which many of them are believed to be susceptible, familiar to any intelligent non-professional reader. He also makes some useful suggestions with respect to the selection and application of materials in order to develop their greatest practical worth and realise their greatest endurance, and further compares the respective merits of the several street pavements now competing for popular recognition and favour with the varying conditions of traffic, climate, and locality to which they are commonly subjected.

The location and grades of country roads is first dealt with, care being taken to explain the elementary principles to be kept in view, anevell barometers and their uses, methods of selecting the line, how to estimate questions of expediency, grades, statistical resistance on grades, &c. Next, the earthwork, drainage, and transverse form of country roads are considered, methods of protecting embankment slopes, making hill side roads, roads over marshes, culverts, catchwaters, &c. In the succeeding chapter the advantages and defects of the several kinds of roads—earth, corduroy, plank, gravel, macadam, telford, and other—are pointed out, and there are chapters on the maintenance and repairs of roads, streets, and street pavements, side-walks, and footpaths, and tramways and street railways. In referring to rubble-stone foundations to be used without telford pavements, he recommends 7 to 8 in. of rubble for a road 12 in. thick, which cannot be objected to, but he goes on to say that the foundation should be constructed with great care, the large stones being laid down first, side by side, flatwise upon the road bed, and firmly set to their places with rammers. The interstices are then filled in, and levelled up with smaller stones, care being taken by selecting the pieces to get them to fit as closely together as possible, and thereby to mutually sustain each other in place.

The object is to use as much material in a given thickness as possible, so as to reduce the volume of voids to a minimum. Now, this scarcely agrees with what is now considered the best practice. Formerly road makers may have followed architects in stipulating for the rubble to be laid in the same way as it was originally laid in the quarry or "bedway down," as the labourers call it, but it is now ascertained that a much more solid and durable road is obtained by putting the handled rubble "tooth-way up"—that is, with the bedding vertical. When similar care is taken in packing the rubble the road is much superior, whilst carelessness on the part of the labourers is less prejudicial—9 in. of rubble, with 4 in. of metalling, makes an excellent road, with ordinary care.

The information conveyed in the volume is of a thoroughly practical character, and gives evidence of the author having had actual experience on the subject on which he writes, whilst the style in which the facts are put forward is such that they can be quickly ascertained and readily utilised.

THE LAW OF MINES, MINERALS, AND QUARRIES.

Reference was made in the Journal of May 13 to this subject, but as there is no undertaking in this great commercial country more deeply affected by its laws than that of mining it may be well again to notice Mr. Rogers's volume. To have the law clearly laid down is, in many cases and under some circumstances, almost an impossibility; and even to have the law as it is already pronounced by the Courts set before us in a clear and intelligible form is by no means a very easy task. In truth the law of mining is a very difficult subject to deal with, and requires very careful study and deep research; it is, therefore, a great advantage that there is one gentleman, and but few others are now living, who has devoted himself for years to legal questions of this description. In 1864 Mr. Arundel Rogers first published a work upon the subject, which at the time was pronounced to be most valuable, well arranged, and full of legal information upon every subject which related to mining. The general principles of law relating to real and personal property rights in mines, minerals, and quarries, were then clearly set forth. Civil and criminal rights were treated of; the coal trade and the laws affecting it were not overlooked, and forms of deeds, mining licenses, and leases, with especial references to forms of covenants, provisions, conditions, reservations, and such like matters, were given for the guidance of those concerned. But the author did not confine this edition of the work to the laws of Great Britain and Ireland, he gave in addition many laws of foreign countries, which served as a guide to obtaining grants to work foreign mines, and afforded valuable information of the position of the English miners in foreign countries.

Working the long work of two Mr. Rogers, an already mentioned, has published another edition of this valuable work, with all the alterations in the law up to the present time. Easements and servitudes, the right of support to adjoining properties, the law of streams and water courses, both natural and artificial, which so deeply affect mining operations are scientifically and practically treated; the regulation and Government inspection of mines are carefully summarised. There are many additions and improvements in the foreign laws as well as our own, and it is doubtful whether anyone interested in or connected with mining will be able to do without a careful perusal of this volume. It may be interesting to Cornish miners to know that the present edition contains what was omitted in the former edition—the jurisdiction and practice of the Stannary Court, and the laws as affected by the Acts of 1859 and 1872, and the new orders and rules of the Stannary Court, published in March last, by which the practice of the Stannary Court is almost entirely changed. The Stannary Courts have now almost exclusive jurisdiction in the winding-up of mining companies, and Mr. Rogers has given the principal sections of the statutes relating to the winding-up of these companies and the law and practice of the Stannaries in reference to them. No other work contains the information.

An important addition to the present edition also consists in the observations respecting the alterations likely to accrue under the Judicature Acts. Formerly questions relating to mining were treated either in a legal or equitable form, and most of the previous decisions were pronounced by courts of law or equity, as the case might be, not upon the actual merits of the whole case, but upon some particular point only, and the consequence was that a dry and harsh construction of the law was given, but now, under the Judicature Acts, as Mr. Rogers observes, there will be a fuller consideration of every case submitted to the Supreme Court; and the author points out the ruling principles which will probably influence future decisions, and the necessity there now is of not placing too much reliance upon previous decisions of the Courts, without a consideration of the whole of the facts upon which such decisions were based.

By way of introducing the volume, Mr. Rogers states that the first edition was published in 1864, and another edition has long since been required, but has been unavoidably postponed until the present time. During the 12 years which have since elapsed the law of mining has undergone considerable alterations, and this has necessitated an increase of the volume from 715 to 930 pages. The portion of the work relating to mines and minerals in foreign countries has been revised in most instances by residents in the districts more particularly referred to. An entirely new chapter on the United States of America has been added, compiled by the author chiefly from original sources, there being at this moment no connected work upon the subject published in the States; each State makes its own laws, subject only to Federal supervision and control upon Imperial questions, and this has

* "A Practical Treatise on Roads, Streets, and Pavements." By Q. A. GILLMORE, A.M., Lieut.-Colonel U.S. Corps of Engineers, Brevet Major-General U.S. Army. London: Triibner and Co., Ludgate Hill.

† "The Law Relating to Mines, Minerals, and Quarries in Great Britain and Ireland: Including Rights of the Crown, the Duchy of Cornwall, and Local Laws and Customs; with a Summary of the Laws of Foreign States, and Practical Directions for obtaining Government Grants to Work Foreign Mines." By ARUNDEL ROGERS, Esq., of the Inner Temple, Barrister-at-Law. Second edition. London: Stevens and Sons, Chancery-lane.

and the dividing and casing of same from the surface to the bottom is in a state of completion for hauling, and comes down in direct communication with the great ground in and about Ellicott's mine. The communication being effected by

aluminous clays, magnetic, graphite, and other minerals to Mr. Frederic Booth, analytical chemist, London, and Mr. George Holcroft, C.E., of Manchester. The use of these silicates and other minerals as refractory adjunct for smelting purposes is the duplication of similar successful applications of the same materials in like form and substance as upon the Continent and United States of America. A patent has been taken out for the process.—*Iron*.

FOREIGN MINING AND METALLURGY.

In the Belgian iron trade affairs remain in a depressed and suffering condition, without any hope of early improvement. At an adjudication for 1100 tons of Vignoles iron rails, without accessories, the lowest tender was that of MM. Sabatier, of Monceau, who offered to supply the lot at 54.19s. 6d. per ton, with delivery at Marcinelle. Some Belgian industrialists would appear to be under the necessity of procuring work at almost any price, and the tender price just reproduced indicates tolerably clearly that no revival in business has either taken place or is among the early eventualities of the future. In the Grand Duchy of Luxembourg pig has been declining; it can be obtained at the furnace at 24.4s. per ton, but even at this low price it is disposed of with difficulty. Tenders are invited for 25,000 tons of Bessemer steel rails for the Berlin and Anhalt Railway. A contract is also about to be let at La Haye for 32 turn-tables. A new tramway locomotive has been completed by the Belgian Metallurgical and Colliery Company at Tubize, and has just been tried on the Bois de la Cambre line. The experiment is considered to have been successful. The new engine makes little or no noise, gives out no smoke or steam, and frightens no horses—these are the advantages claimed for it.

Business in copper has presented little activity at Paris, having been confined to the immediate requirements of consumption, which have rather fallen off of late. Prices have at the same time been pretty well maintained, Chilean, in bars, delivered at Havre, having made 85s. per ton; ditto, ordinary descriptions, 83s. per ton; ditto, ingots, 86s. per ton; English tough cake, 85s. per ton; and pure Corocoro minerals, 84s. 14s. per ton. At Marseilles there has been very little doing in copper of late. There has been rather more animation upon the German copper markets, and some important transactions have been reported. Transactions in tin have been comparatively limited at Paris, nevertheless prices have been rather sustained. Banca, delivered at Havre or Paris, has made 90s.; Straits, ditto, 80s.; and English, delivered at Havre or Rouen, 81s. per ton. The German tin markets have been tolerably well maintained. At Rotterdam the tin market has been firm, but there has not been much business passing upon it. Banca has been held at 49½ s.; business, with delivery at the approaching sale, has been done at 49½ s. Billiton, after having been held at 45½ s., has been rather more offered. Quotations for lead have been rather weak at Paris; French lead, delivered at Paris, has made 22s. per ton. There has been no variation worth mentioning upon the German lead markets. Quotations for zinc have been tending downwards at Paris. The German zinc markets have been very quiet.

It appears from official returns that in the first four months of this year 63,500 tons of pig were imported into France, against 55,400 tons in the corresponding period of 1875; 16,400 tons of iron and plates, against 12,000 tons in the corresponding period of 1875; and 1500 tons of steel, against 1700 tons in the corresponding period of 1875. The direct exports from France in the first four months of this year of pig, plates, iron, steel, &c., amounting in round figures to 26,600 tons, against 27,600 tons in the corresponding period of 1875. The exports by warrants exhibit a large increase this year, and the state of affairs appears, upon the whole, to be rather more favourable than might, perhaps, have been expected. As regards minerals, the imports, which amounted in the first four months of 1875 to 298,000 tons, declined in the first four months of this year to 239,000 tons, showing a diminution of about 20 per cent. The exports of minerals from France in the first four months of this year declined to 22,000 tons, as compared with 48,000 tons in the corresponding period of 1875. The aspect of the French iron trade remains much the same. Rolled charcoal-made iron, machine iron, and sheets, are a little neglected for the moment, but coke-made iron has been in rather more request. Paris has been giving out some rather heavy orders for iron for building purposes. The works of the Nord are stated to be not badly off for orders; one of them has just concluded a contract for 6000 tons of rails for a French railway.

The Belgian coal trade remains in much the same condition. Coke from the Liège basin is offered at 16s. to 17s. 8d. per ton; washed coke from the same source has brought 17s. 8d. to 19s. 2d. per ton. Foreign coal, and especially Westphalian coal, effectually holds the price of Belgian coal in check. A "Mineral Industry Congress" is about to meet at Douai; the Congress will probably make an excursion into the Coudant de Mons. The Royal Asturian Mines Company, a Spanish undertaking, in which a certain amount of French and Belgian capital is engaged, is enabled to give its proprietors a dividend of 22.16s. per share, as compared with 21.8s. per share distributed for 1874. The undertaking is expected to benefit to some extent from the close of the Carlist war.

There is still a good deal of depression in the French coal trade, although a rather marked increase in the deliveries has been noticed in the basin of the Loire. We must not conclude from this that there has been a general improvement; on the contrary, the Nord and the Pas-de-Calais are at present extracting and selling comparatively little coal. A company has been formed in Belgium with a view to the prosecution of sinkings for coal in the coal basins of the Nord and the Pas-de-Calais, the coal basin of the Saône-et-Loire, the coal basin of the Herve (Belgium), the coal basins of the Rhur and Prussia, Holland, &c. M. César Plumet, of Mons, is the president of the new company. M. Bruay, a mining engineer in the Pas-de-Calais, is also associated with the enterprise. The Alais Mines, Foundries and Forges Company commenced the payment on Thursday of an interim dividend for 1875 at the rate of 16s. per share. The aggregate production of coal in France last year is officially returned at 16,949,031 tons, as compared with 17,059,547 tons in 1874.

NEW ZEALAND.—The Correspondent of the *Times*, writing from Wellington, April 4, says that at Hikiteka, on the west coast of the Southern Island, what appears to be an important discovery has been made of an extensive deposits of galena ore very rich in silver. It seems that the existence of this galena in considerable quantity has long been known to the miners in the neighbourhood, but with them nothing but gold was worthy of consideration, and it is only a few weeks ago that steps were taken to ascertain its real value. That question has now been decided by the receipt of the following analysis from the laboratory of the Melbourne University:—

"Medical School Laboratory, the University, Melbourne, Feb. 7, 1875. Memoir of assay of lead and silver ore.—No. I. contains of lead 31 per cent., of silver 73 per cent.; No. II. contains of lead 31 per cent., of silver 39 per cent.; No. III. contains of lead 10 per cent., of silver 39 per cent. M.B. Lecturer on Chemistry and Metallurgy."

As to the genuineness of the samples so sent, the following extract from the *West Coast Times*, the leading newspaper of that district, gives the following particulars:—"We may explain that the samples as enumerated by I, II, and III, were not merely a few specimens chosen from the heap for the purpose of obtaining a high assay, but were out of large boxes filled with the mineral, which we had an opportunity of examining before shipment. There were at least 500 lbs. of specimens sent away, and anyone who may desire to inspect as much more can avail themselves of the opportunity by stepping in to Messrs. Pollock and Bevan's office in Wharf street, where they will find a table covered with it, or if they prefer journey up the left hand branch of the Waitaha river, a few miles south of Ross, they can see hundreds, nay hundreds of thousands, of tons already exposed. Such is the statement of the working prospectors, and there is not the slightest reason to doubt the truthfulness of their story. On the contrary, their statements are in keeping with their action in the past, and both go to prove beyond all question that their belief is that a most important discovery has been made by them."

ROLLING MILL PRODUCTS AT THE CENTENNIAL.—The exhibits of the Cleveland (Ohio) Rolling Mill Company at the Centennial contain many features of novelty and interest. The wire department is represented by the contents of 15 cases, which will contain every possible style, variety, and quality of wire, one case alone containing 60 different kinds, from the coarsest to the finest, some drawn to the diameter of a hair, and so pliable as to admit of being used as thread. Another case contains a pyramid 5 ft. in height composed of coils of different sizes and qualities. One of the curiosities in this department is a long strand drawn into the shape of a carriage whip, 7 1/2 in. in diameter at the butt, and tapering to almost impalpable fineness. Iron, steel, copper, brass, and silver wire made up the list; drawn square, oval, round, twisted, hollow, and three-cornered in shape. This display is certainly one of the finest that is pos-

sible to make in this line. The display in the other departments is equally as good, although not so attractive. There are, among other things, three pieces of Bessemer rail, each 7 ft. long, taken from a promiscuous lot, and each twisted four complete turns without causing a flaw or break of any kind in the metal. These pieces were twisted cold. One of the most novel and telling features of the display is in the shape of a steel rail which was laid on Lake Shore Road over six years ago, and has been in constant service during all that time. The rail is in fair condition, and would do still further service. Numerous specimens of Siemens-Martin steel and boiler plate, bent in every conceivable shape to show the quality and tenacity of the metal, are included in the lot; also, a great variety of forgings, consisting of points and heel points, crank-pins, spindles, &c. A bar of Bessemer horseshoe steel, grooved and prepared for cutting and forming, has eight twists in its length of 2 ft., and shows no sign of flaw or weakness in any part. A three rail bloom of Bessemer steel completes the lot. This bloom is 7 1/2 in. square, and has been cut off by the shears at one end, and broken at the other.—*Coal Trade Journal*.

FOREIGN MINES.

RICHMOND CONSOLIDATED.—Telegram from the mine at Eureka, Nevada—Hall, London: Week's run, \$40,000.

—R. Rickard, May 11: The 700 drift is about the same. The intermediate drift (50 ft. above the 700) is looking well, drifting in very good ore; according to its bearing above we shall soon have the same body in the 700 drift. There has been nothing done in the stopes above the 600. The shaftmen have been working in the No. 2 stop, on back of the 600, where the ledge narrows, and a few good runs of ore are looking very much better, and the ore is of good quality. The machinery in the shaft is working well, and the small engine all the year; the big engine is here, and we hope to get it ready to work some time next week.

GOLD RICH (Hydraulic).—J. A. Stone, May 9: My last letter to you was on April 22, since which I have been from home. On my return I found the Miners' Ditch Company about to make a partial clean-up from my tunnel down to their main tunnel. I determined not to clean up until they make a through clean up, which must be the latter part of this week or the first of next week. By so doing I shall get more wear from my blocks, as they will stand three long runs, but will not last four short runs, from the fact that it is impossible to fasten them in the sluice, so the water will not wash them out when they are badly worn. I have made good progress in washing since my last letter, and the gravel looks much better. The large strata of sand which I have encountered in the washing heretofore are fast disappearing. I anticipate much better results from the washing from this time forward. I shall soon clear up, and cable you the result at once, which you will receive before this reaches you.

SAN PEDRO.—W. Phillips, April 15: The 150 ft. Level: The various drifts are producing good stones of ore, but not enough to warrant a large sale. The end driving round the mantle, south of west, is producing very good stones of ore. The end between the 150 and 135 will produce 24 tons of 18 per cent. ore per fathom. The 122 ft. Level: The end driving round the mantle, south of west, is producing very good stones of grey ore, but not to value.—The 110 ft. Level: The end driving round the mantle, south of west, has improved the last few days, and now producing good stones of native copper; an improvement expected to be reported by next mail.—The 88 ft. Level: The slope in the back of this level is about 10 ft. wide, and will produce 8 tons of 25 per cent. ore per fathom. Chilson sinking in the bottom this level will produce 4 tons of 25 per cent. ore per fathom. This is being sunk to communicate with the 110, and if it lasts down we shall have a good stope of ore ground opened out.—The 47 ft. Level: The cross cut driving towards the Cuba is without change, and growing easy for driving. All the machinery, &c., working well. The sale of ore \$4600.

DON PEDRO.—The ore has been extracted from the underlie lode, Canoa, No. 6 shoot, and No. 8 shoot. The samples of general work have, on the average, been of moderate quality. A little box work has been taken from the average, but it is very poor.—Stopping: Underlie lode. We have not yet met with crushed ground, in consequence of the old timber breaking away in the Canoa stop, beneath the lode in the small incline, going on the dip eastward, is very poor.—Canoa: In the incline commenced in No. 2 stop we followed the course of the line one "set," but the mineral therefrom was too poor for box work. From a part of this same vein, in the south side of No. 3 stop, eight boxes of work have been taken, but they produced only 26 oits.—No. 6 Shoot: No. 1 stop has been continued without change. We have commenced an incline rise from the 31 towards the 25, to test the southern part of this shoot. The samples are of low quality.—No. 8 Shoot: The No. 7 stop has reached the back of the 31, it is of poor quality.—Drainage: The water being drawn from the horizon of the 35 ft. level is 22-30 cubic feet per minute, with the sinking lift unhelped, the surface water being insufficient at date to fork the water in the sump. Very little has been done towards sinking, in consequence of the water being seldom in fork. We have fixed a self-acting flusher over the sump's wheel to turn the water off immediately, in case of a breakage. Wooden pumps, measuring 6 ins. 2 ft. 6 in. in length, have been made, our length of iron pumps on hand is insufficient for the 6-inch lift now being used alongside the plunger. We expect to get this small lift to work to-morrow. The preparation for connecting the stumps wheel to Dawson's rods are being pushed on with our limited force of mechanics as fast as the running work will permit. The bob-pit of the upper balance-bob requiring to be renewed, this has been done to a larger size than before.—Prospective and Running Work: The driving of the 35 cross-cut and the removal of the 30 cross cut have been continued, and repairs to the water-wheel are being made.—Explorations in Mine: The adit level exploration has been suspended, and the force removed to the driving of Bryant's cross-cut towards the north gully explorations.

LETTERS FROM MINE CAPTAINS.—Explorations in the incline in the north gully of M. de la lode has become very poor; this lode is very fluctuating in size and quality—some days we get fair samples, and the lode of a moderate size. In the driving north from the incline we have found the lode very poor, and at a distance of 2 fms. from the incline met with a fissure, beyond which the lode does not, according to samples taken, as yet appear to be auriferous. In the new level, driving west of north, from the mouth of the incline, fair samples have been taken, but at date the lode is small and very poor. We have put four natives to drive Bryant's north cross-cut on contract, to intersect the lode in the above exploration, should it continue in depth. The price from the old exploration level is being continued. We have commenced two other open cuttings in the north gully—one is about 50 fms. west of the incline, and the other about 50 fms. east. In the south gully we have one open cutting driving, but up to date no auriferous sample met with. In the cross-cut north of M. de la lode good looking jacotings is being driven through, but no auriferous samples have yet been taken.

SANTA BARBARA.—June 1: Mr. Hilleke (Paris, April 24) advises that nothing of note had occurred in the mine since last report, the lode having undergone little or no change as regards size or quality.

FRONTINO AND BOLIVIA. The manager (April 12) reports that owing to the extra work of the accountant this month the accounts could not be got ready for the remittance post, but will be sent forward by the next mail on May 13. The remittance (2944) is a very good one, considering that it is the produce of the dry season, and although we only send you a balance of 855, yet I have no doubt that considerable profit remains here, and will go forward next month.

ANTIOQUIA (Frontino).—The directors have advised under date April 12, accompanied by a remittance of gold valued at \$22, the produce of the mines in the month of March.

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BLAKE'S PATENT STEAM PUMP.

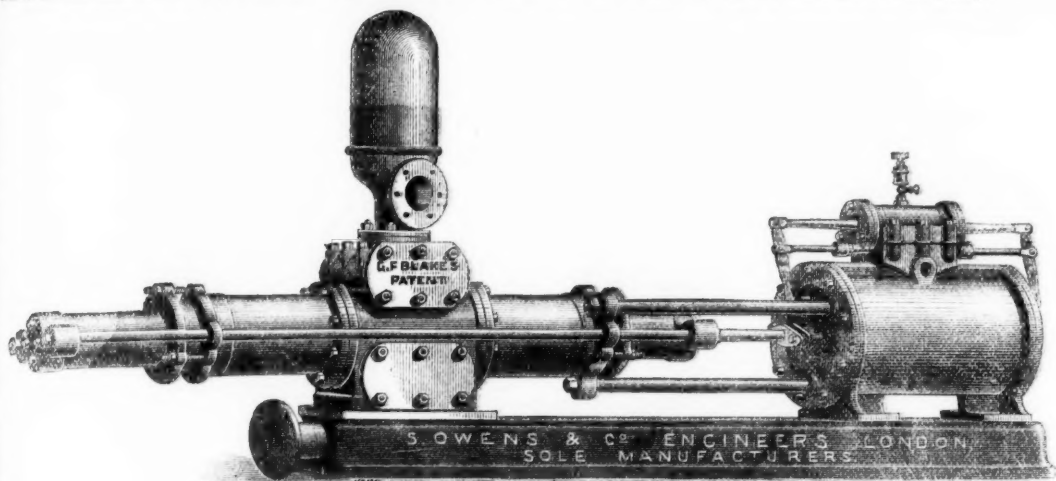
MORE THAN 8000 IN USE.

SOLE MAKERS FOR GREAT BRITAIN.

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Hydraulic and General Engineers, Whitefriars-street, London;
And at 195, Buchanan-street, Glasgow (W. HUME, AGENT).

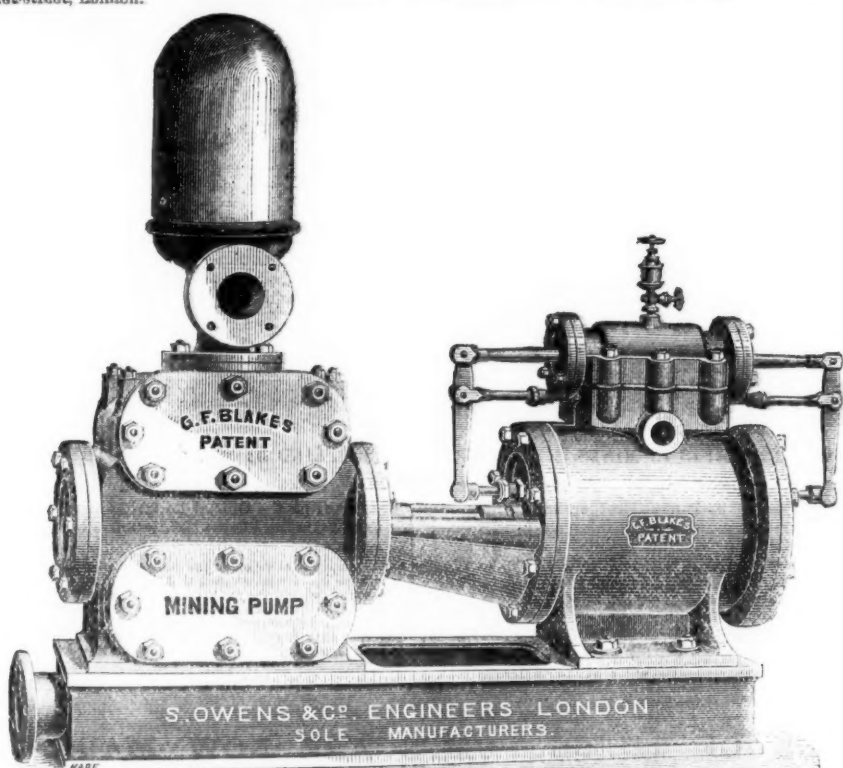
These PUMPS from their SIMPLICITY, RELIABILITY, DURABILITY, and ECONOMY are SPECIALLY SUITED FOR MINING PURPOSES, where large quantities of water require to be raised from great or medium depths with CERTAINTY. They are double-action in their construction, throwing a constant stream of water, can be made of any stroke to suit the space in which they have to work, can be arranged with any combination of steam and water cylinders to suit the pressure and lift against which it is desired to work them, are made of the very best materials and highest class of workmanship, and all working parts can be readily got at by any ordinary workman, and replaced if necessary by a duplicate part (all such being interchangeable) in the shortest possible time. For situations where gritty and sandy water has to be pumped the DOUBLE-PLUNGER PATTERN is recommended. Where space is limited the PISTON PUMP is better suited, a novel feature of which is the PATENT REMOVEABLE LINING, which can be removed in a few minutes and substituted with a new one, without disturbing any other part of the pump.



Blake's Improved Double-plunger Steam Pump.

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In placing the BLAKE STEAM PUMP before the mining world, believe they are offering the BEST, MOST RELIABLE, and ECONOMICAL PUMP that has yet been made, and solicit an inspection of various sizes in operation at their works, Whitefriars-street, Fleet-street, London.



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Any combination of these Pumps may be had to suit circumstances. The following are some of the SIZES SUITABLE FOR MINING PURPOSES:—

Di. of steam cylinders. In.	12	12	12	12	14	14	14	16	16	16	16	18	18	18	20	20	20	24	24
Di. of water cylinders. In.	3	4	5	6	4	5	6	4	5	6	8	4	5	6	8	5	7	9	6
Length of stroke. In.	18	18	18	24	24	24	24	24	24	24	24	24	30	30	30	30	36	36	42
No. of strokes per minute.	30	30	30	30	25	25	25	22	22	22	22	22	22	22	22	20	17	17	15
Quantity in gallons per hour, approximately.	1440	2610	4200	5940	2940	4620	6600	2640	4158	5940	10620	2640	5160	7500	13260	4586	9000	12360	15660

PRICES FOR THE ABOVE, OR ANY SPECIAL SIZE, AND ILLUSTRATED CATALOGUES FURNISHED ON APPLICATION.

PATENT CONDENSORS

Can be supplied for any size pump to effect a saving of fully 30 per cent. in the consumption of fuel, greatly increasing their efficiency

The Blake Pump will work under water, and as efficiently with compressed air as with steam.

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FOR CONVEYING
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SAFETY FUSE,
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Obtained the PRIZE MEDALS at the "ROYAL EXHIBITION" of 1851; at the "INTERNATIONAL EXHIBITION" of 1862 and 1874, in London; at the "IMPERIAL EXHIBITION," held in Paris, in 1865; at the "INTERNATIONAL EXHIBITION," in Dublin, 1865; at the "UNIVERSAL EXHIBITION," in Paris, 1867; at the "GREAT INDUSTRIAL EXHIBITION," at Antwerp, in 1868; TWO MEDALS at the "UNIVERSAL EXHIBITION," Vienna, in 1873; and at the "EXPOSITION NACIONAL ARGENTINA," Cordova, South America, 1872.



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EVERY COIL of FUSE MANUFACTURED by them has TWO SEPARATE THREADS PASSING THROUGH the COLUMN of GUNPOWDER, and BICKFORD, SMITH, AND CO. CLAIM SUCH TWO SEPARATE THREADS as THEIR TRADE MARK.

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Suitable for wet or dry ground, and effective in Tropical or Polar Climates.

W. BENNETTS, having had many years experience as chief engineer with Messrs. Bickford, Smith, and Co., is now enabled to offer Fuse of every variety of his own manufacture, of best quality, and at moderate prices.
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MANUFACTURERS OF EVERY DESCRIPTION OF IMPROVED

PATENT FLAT AND ROUND WIRE ROPES
from the very best quality of charcoal iron and steel wire.
PATENT FLAT AND ROUND HEMP ROPES,
SHIPS' RIGGING, SIGNAL AND FENCING STRAND, LIGHTNING CONDUCTORS, STEAM PLOUGH ROPES (made from Webster and Horsfall patent steel wire), HEMP, FLAX, ENGINE YARN, COTTON WASTE TARPAILING, OIL SHEETS, BRATICE CLOTHS, &c.

UNIVERSE WORKS, MILLWALL, POPLAR, LONDON.
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FOR PUMPING AND WINDING.
SPECIALLY ADAPTED FOR PITS, QUARRIES, &c.
SIMPLE and STRONG; require NO FOUNDATION or CHIMNEY STALK, and are EASILY ERECTED or REMOVED.
SIZES, from 2 to 30-horse power.

Steam Cranes, 1½ to 30 tons, for railways, wharves, &c.; hoist, lower, and turn round in either direction by steam.

Stationary Engines, 1 to 30-horse power, with or without gearing.
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Ships' Engines, for winding, cooking, and distilling, passed by H.M. Government for half water.

Steam Winches, Engines and Boilers for light screw and paddle steamers.

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A. JEFFERY

Respectfully begs to inform Mine Managers, Surveyors, Engineers, &c., the having purchased Mr. Wilton's business, and the very valuable acquisitions and appliances belonging thereto, he has enlarged his Mathematical Instrument Manufactory, and is prepared to supply THEODOLITES, DIALS, POCKET DIALS, LEVELS, TRAVELLING and PLAIN PROTRACTORS, CASES OF DRAWING INSTRUMENTS, MEASURING CHAINS and TAPES, ASSAYERS' SCALES and WEIGHTS, ENGINE COUNTERS, and, in short, every description of Instruments used in SURVEYING, MEASURING, MAPPING, &c.
Repairing in all its branches promptly attended to.

SEND FOR LISTS, SHOWING EXTRA LARGE DISCOUNTS FOR CASH.

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MANUFACTURERS,

105 AND 106, NEWHALL STREET, BIRMINGHAM,
CLOTH AND MANILLA CARTRIDGE

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SELF INKING ENDORSING STAMPS.

DOOR AND WINDOW PLATES of Brass, Zinc, and of Plate Glass.

Letter Copying Presses, Eveletting Presses, Embossing Presses, Stamps for Election Purposes, Dating Stamps, Key and Umbrella Labels, Wine Merchants and Chemists' Wax Seals, Sealing and Bottling Wax, Glue, Post Boxes for Jewellers and others, Brass Checks for large Works, Concert Halls, Hotel Keepers, &c., Brass Labels for Patentees, Gummed Tickets for Drapers, Gummed Labels, &c.

Printing, Letter Cutting, Die Sinking, Engraving, Wood Engraving, Stereotyping, Bookbinding, executed at exceedingly low prices.

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VIENNA EXHIBITION, 1873.



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CORNWALL POLYTECHNIC SOCIETY, 1867 and 1873.

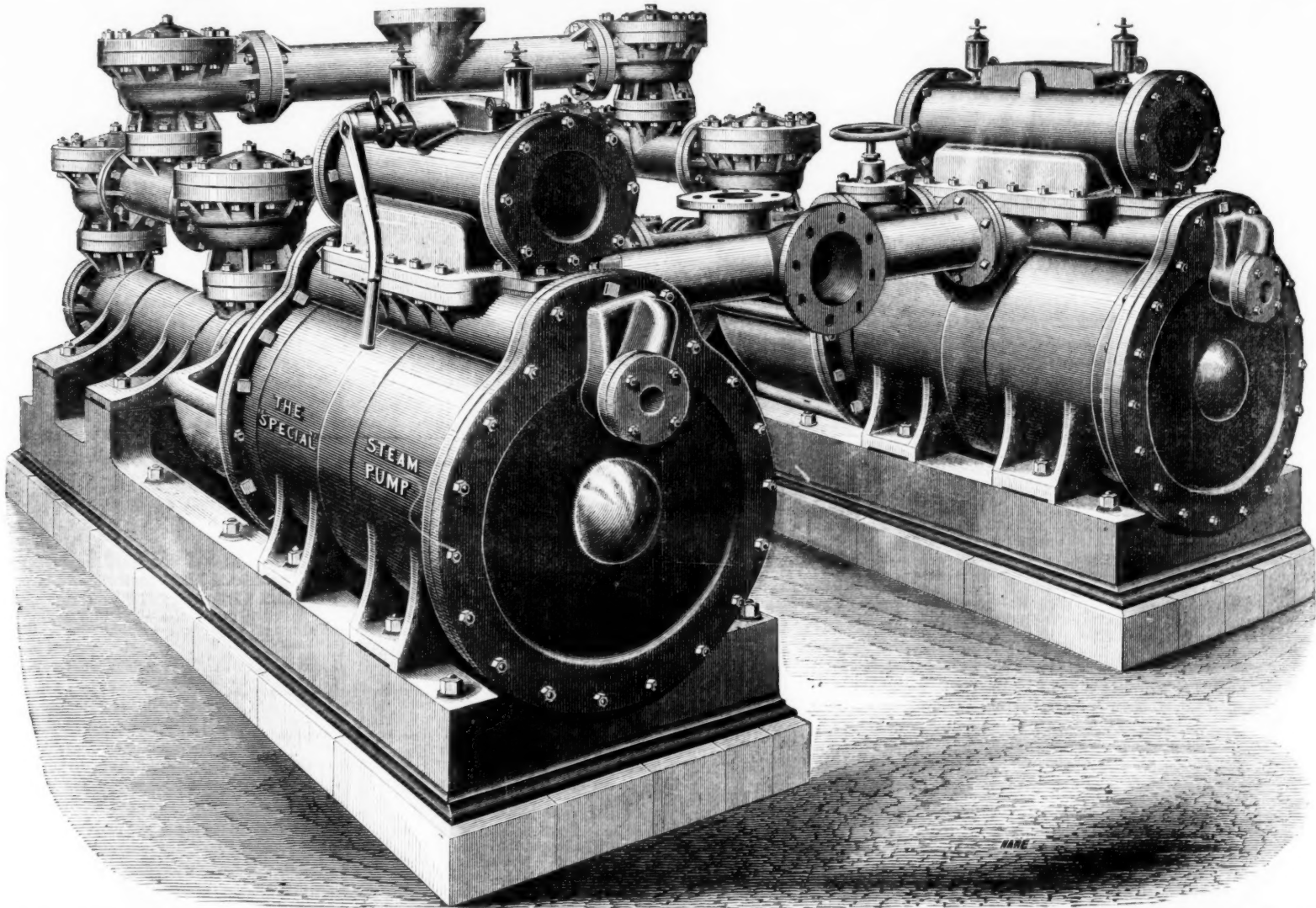
TANGYE BROTHERS AND HOLMAN,

10, LAURENCE POUNTNEY LANE, LONDON, E.C.,
AND BIRMINGHAM. (TANGYE BROTHERS), CORNWALL WORKS, SOHO.

THE "SPECIAL" DIRECT-ACTING STEAM PUMP.

OVER 12,000 IN USE IN ENGLAND AND AMERICA.

SUCCESSFULLY ADOPTED IN A LARGE NUMBER OF MINES IN THIS COUNTRY AND ABROAD.



PAIR OF THE "SPECIAL" DIRECT-ACTING STEAM PUMPS SUITABLE FOR HIGH LIFTS IN MINES, SIMILAR TO MANY SUPPLIED BY TANGYE BROTHERS AND HOLMAN.

The following extracts from a letter, received by Tangye Brothers and Holman, from J. Bigland, Esq., dated Feb. 25, 1875, refers to a "Special" Direct-acting Steam Pumping Engine supplied four years ago to Messrs. Joseph Pease and Partners, for the Adelaide Colliery, Bishop Auckland. The engine is throwing about 8000 gallons per hour, 1040 feet high, in one direct lift:—
"The underground pumping engine at Adelaide Colliery is working night and day. It does its work satisfactorily, and gives us very little trouble. Some of the cup leathers which form the plunger packing have worked three months. The working barrel is in beautiful condition. The average duration of the valve seats is about eight months; they work and keep tight as long as there is a bit of them left. I expect the valves (Holman's patent), and the buffers will last as long as the colliery."

Extract from a letter received by Tangye Brothers and Holman from W. H. Eagland, Esq., dated Feb. 27, 1875, in reference to a "Special" Direct-acting Steam Pumping Engine supplied two years ago to the West Yorkshire Iron and Coal Company near Leeds, to throw 16,000 gallons per hour, 465 feet high in one direct lift:—
"It is at work night and day. Our man goes down to the pump twice a day (Ten A.M. and Four P.M.), to supply the tallow cups. After this it is left every day till he comes next morning, when he goes down again at Ten A.M. as before. The only repairs the pump has had for 12 months are one bucket, which had worked since we got the pump, and one valve seat, but no valve, so it has cost very little. Its first lift is 70 yards perpendicular, then the water passes up pipes for half a mile, ascending another 70 yards, and then another perpendicular pipe of 15 yards—total, 55 yards vertical height."

Extract from the Official Report of the Commission of the German Empire on the Vienna Exhibition of the 1873, treating on Pumping Engines:—
"Contrary to these older pumping engines exhibited, there is now nearly everywhere the opinion established that the ('SPECIAL') pumping engines, placed underground, which are made on A. S. Cameron's principle by Messrs. Tangye and Holman, are preferable to all. They do much duty combined with great compactness. They dispense entirely with the troublesome rod arrangement, giving often rise to stoppages, so that they will be applied shortly to a great extent, and are already in use in many localities. There is no doubt that this is in every respect practical system will command a general adaptation."

200 SIZES AND COMBINATIONS OF THESE PUMPS ARE NOW MADE.

The following are a few of the Sizes for High Lifts in Mines:—

Diameter of Steam Cylinder	In.	7	8	9	9	10	10	12	12	12	14	14	14	16	16	16	16	18	18	18	18	21	21	21
Ditto of Water Cylinder	In.	3	3	3	4	3	4	3	4	5	4	5	6	5	6	7	8	6	7	8	5	6	7	8
Length of stroke	In.	24	24	24	24	36	24	36	36	36	36	36	36	36	36	36	36	48	36	36	36	5070	7330	9750
Gallons per hour approximate		1830	1830	1830	3250	1830	3250	1830	3250	5070	3250	5070	7330	3250	5070	7330	9750	5070	7330	9750	13,000	16,519	20,000	40,000
Height in feet to which water can be raised with 40 lbs. pressure per sq. in. of steam or compressed air at pump		325	425	540	300	665	375	960	540	345	735	470	330	960	615	426	312	775	540	400	300	1058	740	540

CONTINUED.

Diameter of Steam Cylinder	In.	21	21	21	24	24	24	24	26	26	26	26	26	30	30	30	30	30	32	32	32	32	32	32
Ditto of Water Cylinder	In.	8	9	10	6	7	8	9	10	7	8	9	10	12	8	9	10	12	14	8	9	10	12	14
Length of stroke	In.	36	36	36	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48	48
Gallons per hour approximate		13,000	16,519	20,000	7330	9750	13,000	16,519	20,000	9750	13,000	16,519	20,000	30,000	13,000	16,519	20,000	30,000	40,000	13,000	16,519	20,000	30,000	40,000
Height in feet to which water can be raised with 40 lbs. pressure per sq. in. of steam or compressed air at pump		413	326	264	960	700	540	427	345	827	633	500	405	282	840	665	540	375	275	960	758	625	426	312

PRICES OF THE ABOVE ON APPLICATION.—FOR SIZES AND PRICES OF PUMPS FOR LOWER LIFTS SEE SEPARATE LIST.

HOLMAN'S PATENT CONDENSER will be found a great acquisition to all kinds of Steam Pumps, as not only is the exhaust steam completely condensed, and the annoyance from same blowing off entirely got rid of, but a vacuum is obtained in the steam cylinder saving from 20 to 50 per cent. in fuel, and increasing to a considerable extent the economy and efficiency of the Pump.

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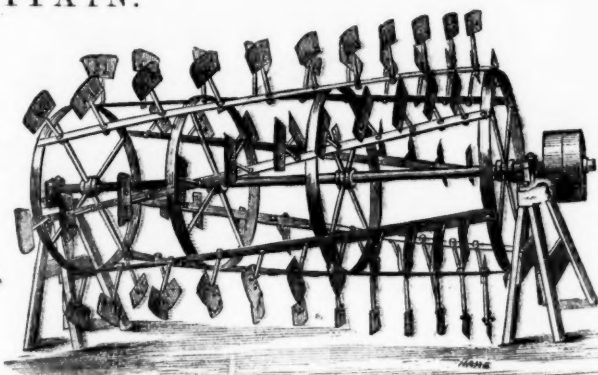
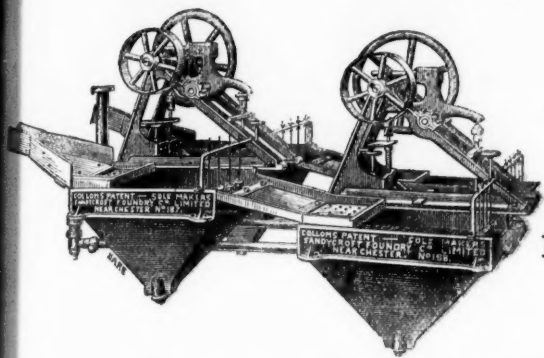
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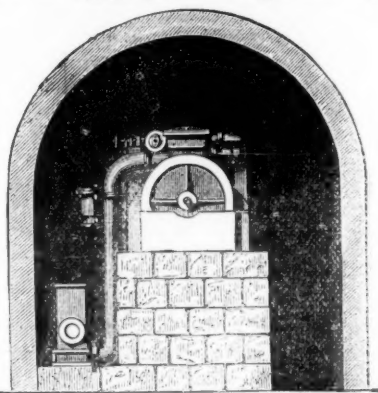
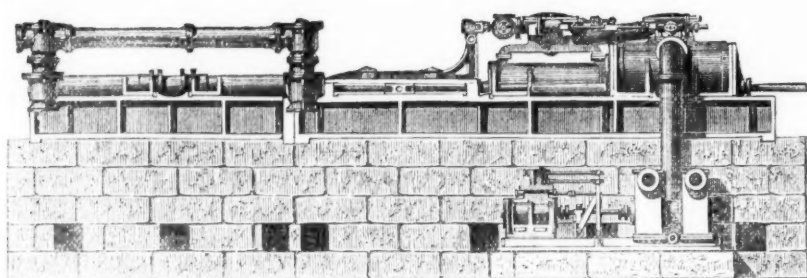
PATENT IMPELLER, OR KNIFE BUDDLE, in use at the following and many other Lead, Copper, Blende, and Tin Mines:—The Van, Roman Gravel, Tankerville, Ladywell, Lisburne, East Black Craig, Old Treburgett, Penhale & Barton, Bog, Linares, Fortuna, Alamillos, Minera Halvans, &c.

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THE COMPOUND DIFFERENTIAL ENGINE AND FORCE PUMPS,

With Separate Condenser, as applied Underground, forcing 700 gallons per minute 920 feet high.

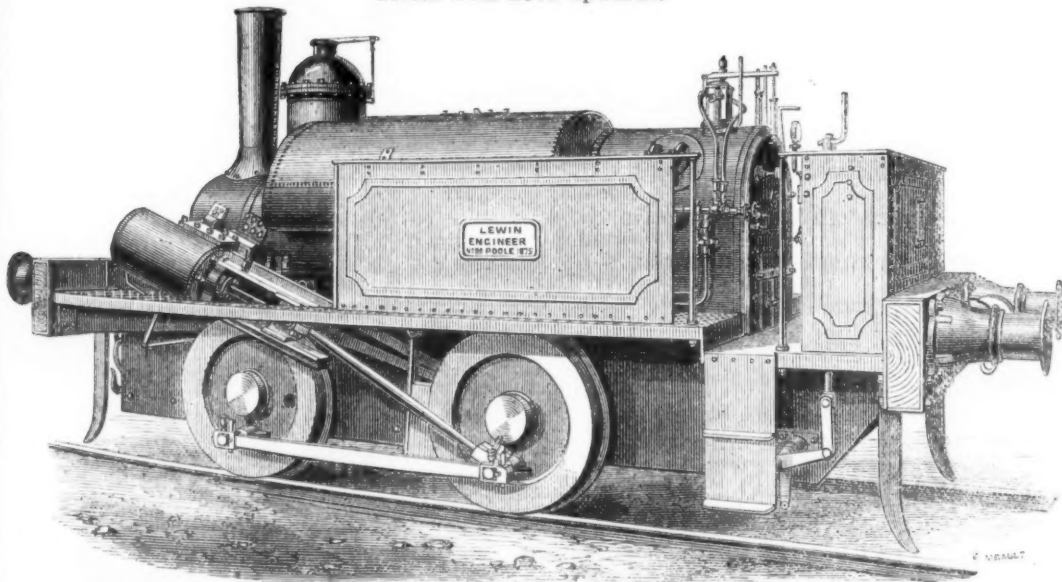
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The above represents LEWIN'S 10 by 18 DIRECT-ACTING LOCOMOTIVE, taken from a photo of one on a 4 ft. 8½ in. gauge.

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THE EXTRAORDINARY ADVANCE in the PRICE of COALS has DIRECTED more ATTENTION to WATER POWER, and to the BEST MANNER of APPLYING IT. For many years it has been, to a great extent, neglected and undervalued. One great objection to it has been the variable nature of most streams in these countries, having abundance of water during the winter half-year, and very little in the dry season. No kind of wheel hitherto known was able to give the proper proportion of power from the smaller quantities of water, so that it became the practice very generally to use steam entirely during the summer half of the year, letting the water go to waste. This is now completely prevented, and the full available power can be obtained from a stream at every season by using

Mac Adam's Variable Turbine.

This wheel (which is now largely in use in England, Scotland, and Ireland) is the only one yet invented which gives proportionate power from both large and small quantities of water. It can be made for using a large winter supply, and yet work with equal efficiency through all variations of quantity down to a fifth, or even less if required. It is easily coupled to a steam-engine, and, in this way always assists it by whatever amount of power the water is capable of giving, and, therefore, saves so much fuel.

This Turbine is applicable to all heights of fall. It works immersed in the tail-water, so that no part of the fall is lost, and the motion of the wheel is not affected by floods or back-water.

References to places where it is at work will be given on application to the makers.

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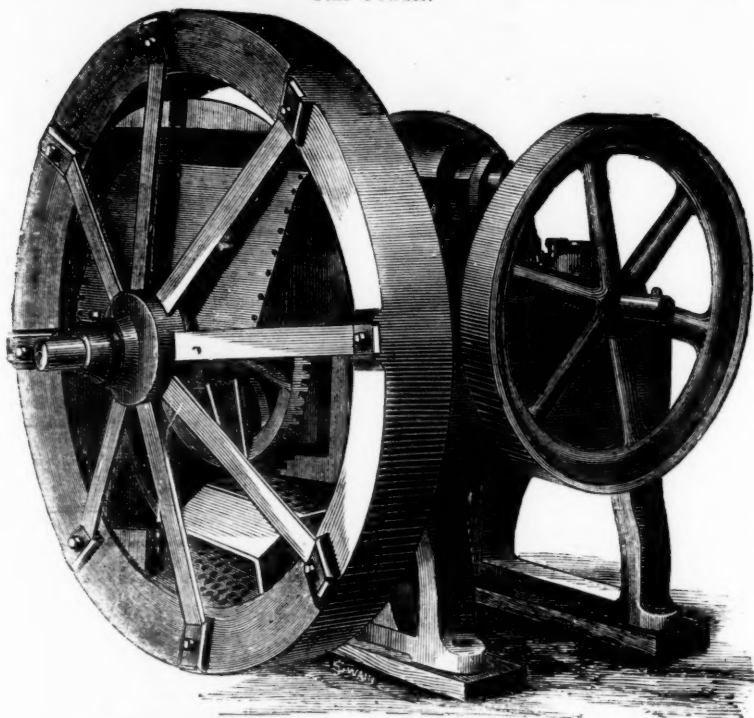
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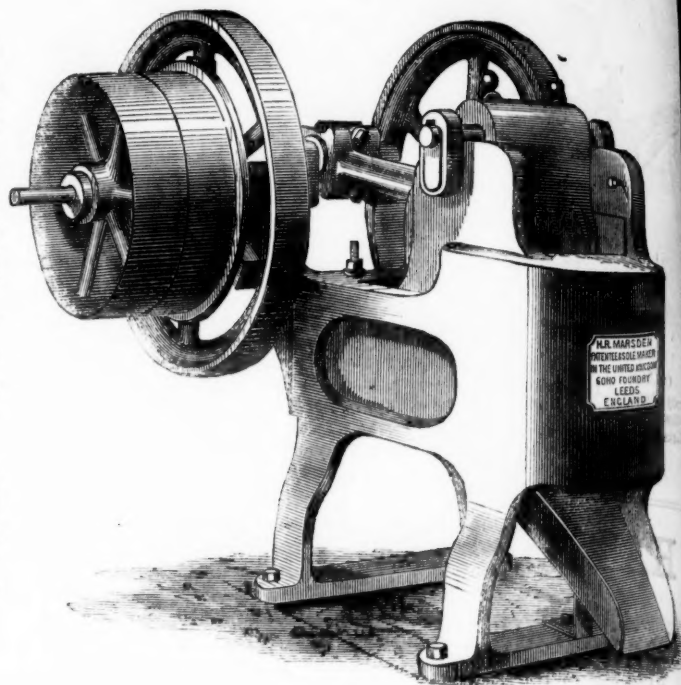
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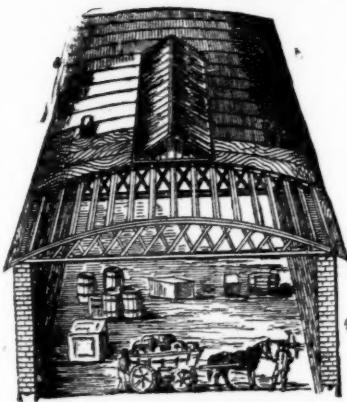
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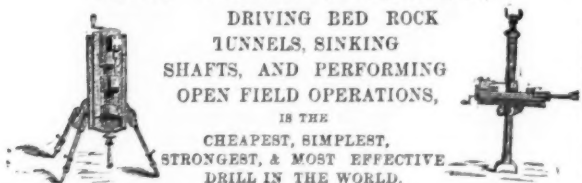
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